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CHILDREN'S ETHNIC ATTITUDES: I. RELATIONSHIP TO CERTAIN PERSONALITY FACTORS[1]

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Research on social and ethnic attitudes is lending increasing support to the contention that beliefs and opinions do not exist in isolation and autonomy, but rather are integrated and interrelated in consistent and meaningful fashion. On social issues where attitudes begin to take on an intensity of conviction, where an opinion as to *pro* or *con* commits or obligates the subject in any way, this integrational characteristic is especially marked.

Thus, in the case of pro- or anti-Semitic attitudes an extensive network of related factors has been identified (3, 4). Subjects obtaining high scores on an anti-Semitism scale tend to secure higher scores on various maladjustment inventories, to come from lower socio-economic environments, to be more categorical in style of thinking, to be less favorably disposed toward other minority groups, toward school, labor unions, and Russia, and to be in favor of universal military training. These relationships are sufficiently strong that ethnic attitudes can be reasonably accurately predicted from knowing how a subject feels about these other issues (4).

There is reason, too, for believing that this clustering of attitudes and opinions has more than correlational validity. That is, there seems to be a number of underlying variables which synthesize and account for the observed interrelationships, such as the fundamental conservatism and ethnocentrism observed by Frenkel-Brunswik and Sanford in their anti-Semitic subjects (3).

Considerations such as these lead quickly to a concern with developmental questions. If ethnic attitudes are characterized by such a closely-knit and fundamental structure in the adult, then it would seem reasonable to suppose that their genesis and early development should be found in the childhood and adolescent years. Frenkel-Brunswik (2) has, indeed, found evidence for such a supposition. In a study of 120 children of ages 11 to 16 who scored at the two extremes of a generalized intolerance scale, the following factors were found to characterize the more prejudiced children: (1) less detached, abstract, and far-reaching sense of social justice; (2) rejection of weakness and individuality; (3) emphasis on dichotomy of sex roles; (4) admiration for strength, power, and money; (5) submission to,

[1] This is one of a series of studies on the broad problem of social responsibility being conducted in the Laboratory for Research in Social Relations, University of Minnesota, under a grant from the Carnegie Corporation.

but strong resentment of authority; (6) excessive concern with status values, conventionality, politeness, etc., and external moral values; (7) intolerance for ambiguity; (8) fearful and catastrophic conception of the outside world; and (9) more explosive and diffuse manifestations of aggressiveness.

The purpose of the present study has been to identify some of the correlates of the ethnic attitudes of grade school children with special emphasis on personality factors such as those which have been referred to above. The particular focus has been the attitudes of grade school children toward Negroes.

The Measuring Instruments

The first requirement in carrying out the present study was the construction of a suitable attitude scale which would be meaningful to school children, and which would actually identify children holding more and less favorable opinions concerning Negroes. A large number of measuring devices was considered, but for various reasons, such as complexity of vocabulary, length, inclusion of situations having no experiential relevance for young children, and so forth, none was well-suited to our purpose. Because of this it was decided to devise an instrument especially for this study.[2]

A large number of statements which could pertain to any group, but which included many anti-Negro stereotypes, was written, and from these some 150 which seemed to be simple, unambiguous, and pertinent were selected.

The questions were then given to children in the fifth and sixth grades of a public school, together with a long rectangular card divided into five cells. These cells were inscribed, "A very nice thing to say," "A sort of nice thing to say," "Just all right," "A sort of bad thing to say," and "A very bad thing to say." Each child was given a packet of questions, and was then told:

> Each card has a sentence on it. These sentences are things which a child might say about other people. Some of the sentences are nice things to say, some are just all right, and some are bad things to say. You read each sentence and then decide whether you think it is a nice thing to say, or a bad thing to say. After you have decided, place the sentence on the proper pile on the long card in front of you.

The technique here, of course, is the Thurstone judging system for establishing equal-appearing-interval attitude scales.

The children understood the task readily, and had very little difficulty in sorting the questions. An examination of the semi-interquartile ranges for each item permitted the rejection of questions whose valuational connotations were ambiguous or unclear. From this analysis about 75 statements, covering the range from most to least favorable, were retained for the next step.

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[2]Dr. Neal Gross of the Department of Sociology of the University of Minnesota and a member of the Laboratory for Research in Social Relations, collaborated with the authors in developing this scale.

The next phase in the scale development was the administration of these 75 sentences to third-, fourth-, and fifth-grade students in two different schools. The sentences were presented as a conventional attitude scale, with the instructions that all of the sentences referred to Negroes. The items were read aloud by the examiner, and proctors were present to help any children having trouble in following the instructions, or in understanding the questions.

The highest and lowest scoring 25 per cent of the papers were chosen, and an item analysis of the entire scale was carried out. This procedure left about 30 sentences which showed good discrimination (at or beyond the five per cent level in every case), and still covered the total range of reaction. These 30 items were then administered individually to selected children from a third-grade class, including good, average, and poor readers, and questions which appeared to be too difficult, or which were responded to on an irrelevant basis, were eliminated. A final scale of 26 items was developed which covered a range of opinion from favorable to unfavorable (as judged by children themselves), which discriminated between high and low scorers, and which could be read and answered sensibly by nearly all of the children at the grade levels selected for study. The split-half reliability of this scale, even in the third-grade groups where reading problems would most seriously affect the results, was consistently at or above + .80.

From this 26-item scale (which was used extensively in some of the larger projects mentioned in the opening footnote), 18 most highly differentiating sentences were chosen for the present study. These items, referred to as the *Attitude Scale,* are given below (the instructions specified that all the sentences were about Negroes, and that each was to be answered "agree" or "disagree."):

They work hard.
They make good teachers.
I would like to live next door to them.
I do not like them.
It is easy to be friends with them.
I would like to have them come to eat at my house.
They are good neighbors.
They often hurt other people's feelings.
I would like to be in a club or on a team with them.
They are always honest.
They have done a lot to help our country.
I would not want to ask any of them to a party.
I would like to go on a picnic with them.
They are pretty dumb.
They get excited over little things.
I would like to have one for my teacher next year.
It is a waste of time and money to send them to college.
I would like to see one of them get elected President of the United States.

In addition to this basic scale, social distance scales eliciting attitudes toward Negroes, and toward Jews, were also included. The items from the *Social Distance Scales* are given below:

I would let them visit our country.
I would let them live in our country.
I would let them go to my school.
I would let them live in my neighborhood.
I would let them live next door to me.
I would let them play at my house.
I would let them come to a party at my house.
I would let them be my best friends.
I would be willing to marry one of them when I grow up.

A series of eight questions adapted from one of Frenkel-Brunswik's questionnaires was also administered[3] in order to obtain some direct evidence in the present study on some of the factors she had found in the case of a more general ethnic intolerance. These items, called the *General Intolerance Scale,* are listed below:

All kinds of people from any race or religion should be allowed to eat in the same restaurant.
It is a bad thing to have a city divided into different parts with each kind of people living in their own part.
A dance hall should allow all kinds of people from all races to go to the dance.
America is a lot better off because of the foreign races that live here.
The city I live in should allow different kinds of people from different races to stay in the same hotel.
Different races and religions would get along better if they visited each other and shared things.
When white people are sick and need blood transfusions, they should be happy to get blood from other races and religions.
It would be better for everybody if people from all races and nationalities were allowed to go to the same churches.

To the above items 24 personality inventory questions which seemed to embody various factors reported in the literature as related to prejudicial attitudes toward various minority groups were added. Most of the questions were adaptations of personality items previously studied (4), but some were suggested by the papers of Frenkel-Brunswik (2), and of Frenkel-Brunswik and Sanford (3). These 24 personality inventory items are reproduced below:

It is all right to get around the law if you don't actually break it.
The most important thing a child can learn is to mind his parents.
The best rule is to play fair with your own gang and let the other children look out for themselves.
About the best way to judge a man's success in life is to see how much money he makes.
If a person is not happy it is just his own fault.
There are only two kinds of people: the weak and the strong.
Teachers should tell the children what to do and not worry about what the children want.

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[3]The writers wish to thank Dr. Frenkel-Brunswik, and her collaborators, Drs. Milton Rokeach and Murray Jarvik, for making this scale available.

Some day a flood or earthquake will kill everybody in the world.
I think most people would tell a lie to get ahead.
I have often been punished unfairly.
If a person doesn't like the way our country does things he should just keep his mouth shut.
I refuse to play some games because I am not good at them.
Even if a child is being scolded unfairly, he should never talk back to his parents.
I often feel as if I have done something wrong or bad.
Most people are honest only because they are afraid of being caught.
A leader should show that he is the boss and not worry about being nice to people.
Most people will cheat if they can gain something by it.
Most of the other countries of the world are against us, but they are afraid to show it.
Most people hate it when they have to help someone else.
It is really true that you will have bad luck if a black cat crosses your path.
I have more than my share of things to worry about.
It is all right for a person to try and grab everything he can get in this world.
It would be better if the teachers were more strict.
Poor people should look out for themselves and not expect others to help them.

Procedures

The children who were given the tests and questionnaires just described included all those in the fourth, fifth, and sixth grades of two Minneapolis, Minnesota, public schools, giving a total sample of approximately 242 children. From this total, a number of subsamples were picked for special analyses.

The first comparison carried out was between the highest and lowest scoring children on the 18-item *Attitude Scale*, in each school.[4] The responses of these children to each of the 24 items in the personality inventory portion of the questionnaire were tabulated; the thirteen most significant items emerging from this analysis appear in Table I.

Some readers might question the listing of items with a probability as low as, say, .36 (item 8, School A). The reason for choosing these items for consideration was that the percentage differences were all in the same direction, and the combined probabilities[5] were less than .05 in all cases.

Inspection of the thirteen items in Table I does appear to reveal some of the characteristics which have been found to be associated with preju-

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[4] The mean score on the 18-item scale for 242 children was 14.0, with a standard deviation of 3.51. A numerically low score indicates existence of prejudice, hence the prejudiced children are more adequately "measured" in this skewed distribution. The estimated reliability of this abbreviated scale by the Kuder-Richardson formula (5) is + .78. This value, although not impressive, is probably satisfactory for an exploratory study.

[5] The method of combining probabilities is the relationship between the natural logarithm of the probability value and chi square reported by Palmer O. Johnson, in *Statistical Methods in Research*, N.Y.: Prentice Hall, 1949, p. 172, and suggested by him to be applicable to probabilities based on different samples as well as on independent probability estimates on the same sample. The function referred to:

$$\log_e P = -1/2X^2, \text{ where } d.f. = 2.$$

TABLE I

PERSONALITY INVENTORY ITEMS WHICH DISCRIMINATE BETWEEN CHILDREN WITH HIGH AND LOW SCORES ON THE (NEGRO) *Attitude Scale* IN TWO PUBLIC GRADE SCHOOLS

Item	SCHOOL A* Per Cent Agreement *Tolerant*	*Intolerant*	*C.R.*	*P*	SCHOOL B† Per Cent Agreement *Tolerant*	*Intolerant*	*C.R.*	*P*
1. The best rule is to play fair with your own gang, and let the other children look out for themselves.	40	55	1.31	.20	37	63	2.27	.04
2. There are only two kinds of people: the weak and the strong.	24	61	3.18	.005	34	50	1.41	.18
3. Teachers should tell the children what to do and not worry about what the children want.	26	71	3.92	.001	28	39	1.01	.32
4. I have often been punished unfairly.	24	53	2.60	.01	26	34	0.76	.43
5. If a person doesn't like the way our country does things he should just keep his mouth shut.	37	64	2.35	.03	16	45	2.75	.01
6. I refuse to play some games because I am not good at them.	13	29	1.71	.09	13	39	2.67	.01
7. I often feel as if I had done something wrong or bad.	66	76	0.96	.36	58	84	2.49	.02
8. Most people are honest only because they are afraid of being caught.	29	45	1.35	.18	11	42	3.18	.005
9. Most people will cheat if they can gain something by it.	63	74	1.03	.30	39	66	2.27	.04
10. Most of the other countries of the world are really against us, but are just afraid to show it.	21	58	3.30	.003	16	39	2.33	.03
11. Most people hate it when they have to help someone else.	13	39	2.68	.01	16	37	2.08	.05
12. It is really true that you will have bad luck if a black cat crosses your path.	5	18	1.78	.08	0	8	1.78	.08
13. I have more than my share of things to worry about.	24	42	1.67	.10	16	39	2.33	.03

* The two samples from this school each consisted of 20 boys and 18 girls.

† The two samples from this school each consisted of 19 boys and 19 girls.

dice in adolescents and young adults. The more prejudiced child favors his own immediate group over any larger society, he thinks categorically of "weak" and "strong," he declares himself in favor of authoritarianism on the part of the teacher, he is suspicious of the integrity of others, and so forth. In general, the picture one gets of the prejudiced child from this list of statements suggests fear and distrust of others, lack of confidence in self, feelings of guilt and uneasiness, insecurities and doubts about the larger physical and social world, and possibly a reactive hostility toward people who are "weak" or "different."

A similar analysis of the 24 personality items was carried out using the eight general intolerance questions adapted from the Frenkel-Brunswik scale as a criterion. Only six personality items were retained in this analysis. Two of these items, Nos. 3 and 5 in Table II, fell above the 5 per cent level but below the 10 per cent level by the combined probability criterion. This small number of items probably reflects the unreliability of the criterion measure more than an actual lack of association. Scores on the *General Intolerance* scale could only vary from zero to eight, which necessitated a marked reduction of the actual range of opinion which could be assumed to exist. The items which emerged in this analysis are presented in Table II.

TABLE II

PERSONALITY INVENTORY ITEMS WHICH DISCRIMINATE BETWEEN CHILDREN WITH HIGH AND LOW SCORES ON THE *General Intolerance* SCALE IN TWO PUBLIC GRADE SCHOOLS

Item	SCHOOL A* Per Cent Agreement *Tolerant*	*Intolerant*	*C.R.*	*P*	SCHOOL B† Per Cent Agreement *Tolerant*	*Intolerant*	*C.R.*	*P*
1. It is all right to get around the law if you don't actually break it.	54	68	1.08	.28	47	68	1.85	.06
2. The best rule is to play fair with your own gang, and let the other children look out for themselves.	36	61	1.87	.07	50	63	1.14	.24
3. There are only two kinds of people: the weak and the strong.	39	46	0.53	.62	29	53	2.13	.03
4. I refuse to play some games because I am not good at them.	18	36	1.52	.14	13	29	1.81	.07
5. It is really true that you will have bad luck if a black cat crosses your path.	7	25	1.83	.08	5	8	0.53	.57
6. I have more than my share of things to worry about.	21	54	2.55	.02	21	34	1.27	.20

* The two samples from this school each consisted of 14 boys and 14 girls.
† The two samples from this school each consisted of 19 boys and 19 girls.

Although the levels of significance are distinctly lower in this analysis than in the previous one, the same kinds of factors seem also to characterize the less tolerant children when selected according to scores on this shorter, more generalized, attitude scale.

The final item analysis of the 24 personality questions was in relation to the *Social Distance* scale concerning Jews. The distribution of scores on the *Social Distance* scale showed the same attenuation found for the *General Intolerance* scale, and in addition a noticeable clustering of scores near the most accepting end of the continuum. These facts made it difficult to obtain pairs of samples clearly differentiated by their responses on the *Social Distance* scale. The samples chosen, as indicated in Table III, were quite small.

In Table III it appears again that, although the retained items are not as clearly significant as in Table I, the general pattern of response is similar. The less tolerant children, as judged by the *Social Distance* scale, have a cyni-

TABLE III

PERSONALITY INVENTORY ITEMS WHICH DISCRIMINATE BETWEEN CHILDREN WITH HIGH AND LOW SCORES ON THE *Social Distance* SCALE (TOWARD JEWS) IN TWO PUBLIC GRADE SCHOOLS

Item	SCHOOL A* Per Cent Agreement *Tolerant*	*Intolerant*	*C.R.*	*P*	SCHOOL B† Per Cent Agreement *Tolerant*	*Intolerant*	*C.R.*	*P*
1. If a person is not happy it is just his own fault.	31	63	1.76	.10	28	56	2.01	.06
2. I think most people would tell a lie to get ahead.	37	50	0.68	.45	36	64	1.98	.06
3. Most people are honest only because they are afraid of being caught.	19	25	0.41	.70	8	40	2.65	.03
4. Most people will cheat if they can gain something by it.	56	63	0.34	.72	52	84	2.43	.02
5. Most of the other countries of the world are against us, but are just afraid to show it.	18	50	1.84	.08	16	52	2.69	.015
6. Most people hate it when they have to help someone else.	25	37	0.79	.44	16	48	2.43	.02
7. I have more than my share of things to worry about.	19	69	2.85	.01	12	48	2.78	.01

* The two samples from this school each consisted of 8 boys and 8 girls.

† The two samples from this school each consisted of 9 boys and 16 girls.

cal, distrustful opinion of others, are fearful of being exploited or duped, or have feelings of having been treated unfairly.

Summary

If we attempt to synthesize briefly the materials reported in this paper, it would appear that the following conclusions are justified:

1. There is a relationship between children's attitudes toward specific groups, such as Negroes and Jews, and between such attitudes and scales assessing more generalized reactions of tolerance and intolerance.
2. Responses to personality inventory items which embody sentiments of hostility, resentment, distrust, insecurity, etc., can be shown to be related to both the more particular, and more generalized, attitudes mentioned above; moreover, the direction of relationship is the same in all cases.
3. School children, then, who appear to be more intolerant also give evidence of being more constricted, cynical, and fearful, less confident and secure, and more suspicious and more ethnocentric than children of greater tolerance.

Such results suggest that to bring about real and lasting changes in social attitudes one must attend to the total personality structure as well as specific attitudes. Possibly this structure provides one of the basic conditions under which attitudes, desirable or undesirable, originate, develop, and flourish. It would seem reasonable to expect that, as long as a given personality system persists, clusters of attitudes which are consistent with that system will also persist. Changes in attitudes may then, to a large extent, be dependent upon changes in the total personality. Programs of social welfare and amelioration should take account of considerations such as these if the goals include an initiation of stable and meaningful changes in attitudes and perspectives.

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ILLNESS EXPERIENCE OF A GROUP OF NORMAL CHILDREN[1]

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The illness experience of a group of 126 normal children included in an eighteen-year growth study comprises the subject matter of this report. With medical emphasis shifting gradually toward development as opposed to pure pathology, it becomes of increasing interest to define what are the usual experiences which can be expected for the normal child receiving ordinary care. Such medical surveys may help prepare young parents for a certain minimum of expected ill health in their youngsters; they also may serve to illuminate the areas where preventive efforts are most needed.

The purposes, population, and methodology of the Berkeley Guidance Study have been described by its director, Dr. Jean Walker Macfarlane (1). The 252 children of the Study were selected on an arbitrary ordinal basis from the Birth Certificate Registry of Berkeley, California, beginning January 1, 1928, and closing June 30, 1929. The sample is drawn from families which are representative of the families having children in the city in which it was selected, but it reflects a considerably higher educational level than that of the United States at large.

The subgroup of 126 children under consideration here is the half which was selected for "guidance" as against a group of the same number, matched for significant socio-economic factors, which was followed as a "control." According to ordinal position among siblings, the distribution of children when the families were completed was as follows: singletons, 17 per cent; eldest, 32 per cent; second, 26 per cent; third, 17 per cent; fourth, 6 per cent; and fifth and sixth, 1 per cent each.

All family members of this Guidance Group were given a continuing opportunity for periodic discussion and counsel with the staff psychiatric social workers and psychologists. The interviews covered many aspects of personal life, including the medical. But the only medical advice given

[1] The data were collected by some 15 physicians and 20 case workers: a list too long to enumerate, although their contribution is herewith gratefully acknowledged; as is also the cooperation of the Berkeley Health Department in giving us access to their records.

Statistical analysis of the material was supervised by Margaret M. Snyder with the advice of Dr. Marjorie P. Honzik. The statistical staff included Arline Burton, Jane Toy, Joan Kroeber, and Ben Ard. The figures were drawn by Katherine Eardley.

Funds for clerical and statistical analyses were provided by a grant-in-aid from the U.S. Public Health Service. The study proper was financed by funds from the Laura Spelman Fund, General Education Board, the Rockefeller Foundation, and from the University of California.

was in the nature of referrals back to attending physicians. In other words, the staff took no responsibility for medical care.

Health data are compiled from the following sources:

1. *Prenatal and natal data* were obtained from physicians and hospital records.
2. *A public health nurse* made health notes during home visits when the infant was one month of age and approximately every three months thereafter until the age of twenty-one months.
3. *Medical examinations* were made at the Institute of Child Welfare at 21 months, 36 months, and at yearly intervals thereafter through 18 years. At these times examining physicians noted the interval health history as well as the current status. For statistical purposes, age has been calculated as of the last birthday.
4. Health data were also collected by *clinical psychologists and psychiatric social workers* in the course of their interviews with parents and child.

In addition to medical histories and examinations, these accumulated data include anthropometric records and evaluations of developmental status, physiological status, and handicaps; from age eight years on, there are also semiannual hand and knee X-rays to indicate skeletal maturation. The material, therefore, provides interlocking facets of medical information which will achieve their greatest value as they are related to each other, as well as to still other aspects of personal and mental growth. Immunizations were not consistently recorded and were, therefore, not analyzed here.

Holland (2) has observed that because of the "low mean duration and high recovery rate which characterize illness in childhood," the "amount of disability accruing from the illness of childhood is disproportionately low with reference to the high frequency of illness at this period." The incidence of illness which forms the substance of this paper, therefore, deals with a different aspect of medical observation than would be subsumed under the term "child health." In other words, a surprising amount of acute illness in childhood is compatible with the concept of good health. This is also the conclusion drawn by Nancy Bayley (3) from a comparable survey in the same Institute of 61 other children from birth to five years.

Limitations of the Data

With health data coming from the variety of sources indicated, the records obviously varied from child to child and from year to year, both in their completeness and in their medical precision.

In general, the records or periods with the more frequent entries are medically more complete, since elapsed time erases many details. Frequency of contact was influenced not only by fortuitous circumstances, but also by the state of relations between clinic and family. Since this was a group receiving psychological guidance, the children with more troubles tended to be seen more often.

Individual biases among the clientele as well as among the staff further

influenced the content of the records. Some children and parents played their troubles down; others played them up. Some interviewers were health-minded while others were not. Among the physicians, some were alert to developmental deviations while others looked only for disease. Thus, the notes of one pediatrician may show a high frequency of flat feet while another sees infection in almost every tonsil.

A further medical deficiency of the physicians' notes is that they are the records of clinical examinations made primarily for purposes of observation. Thus, they lack the diagnostic laboratory supports of hospital or office treatment records. Where serious illness occurred, however, such confirmatory data were often obtained from the physician or clinic responsible for medical care.

The adequacy of our sample of 126 children in the Guidance Group was tested by comparing the illness experience of the first two years of life with the experience of the matched Control Group mentioned above. The ratings used for this comparison were made by Herbert R. Stolz (4), on the basis of the same data as are here reported, but using a somewhat different rating scale, weighted according to the possible effect of illness on the child's development. Figure 1 shows the remarkable similarity in the distributions of his ratings for the two groups, and thus indicates that the number and composition of the Guidance Group are such as to constitute a reasonably representative community sample.

Illustrative Case

One abstract is presented to illustrate both the original data and the variety of acute and subacute illness which is compatible with essentially good health. A history without serious chronic illness or handicap was chosen because it is more typical of the experience of the group as a whole. It is also characteristic in its general pattern: gastro-intestinal symptoms and allergies in the early years and again at adolescence, upper respiratory infections throughout, a fair share of communicable disease especially in the school years, adolescent skin rashes, a moderate number of accidents, two common surgical procedures. Such is the average illness story of a healthy boy who passed a rigid paratrooper's examination at age 18 (Appendix I, Illustrative Case).

Even our least morbid record lists in its course the following items: communicable diseases, 3; colds, 7; other upper respiratory infections, 6; gastro-intestinal symptoms, 4; accidents, 1; tonsillectomy and four other minor ailments.

Rating Scale

Records were analyzed for the occurrence and severity of illness. The tabulation in Appendix II shows the empirical classifications used.

In each category of illness, a rating of 1 indicated the mildest form of mild disease, with higher ordinates indicating increasing severity, up to 5.

Thus, among colds, 1 might mean a one-day "sniffle," whereas even a severe cold would rarely rate more than 3; among gastro-intestinal disturbances, 1 might be a mild diarrhea, whereas an acute confirmed appendicitis would be indicated by 5. Ratings higher than 1 were also used to denote a frequency or long duration of occurrence of a malaise, even though individual manifestations were mild—for instance, a report of continuous persistent eczema might rate 3 even though it involved a rather limited skin area. By this device the raters tried to take some cognizance of the seriousness of the disease categories relative to each other.

COMPARISON OF DISEASE RATINGS OF CHILDREN IN THE GUIDANCE GROUP —— AND THE CONTROL GROUP ---

LEGEND

Children who had suffered illness or physical handicap of such kind, frequency, severity and duration as to justify the assumption that development was "markedly" modified were given ratings of 5
"definitely" " " " " " 4
"slightly" " " " " " 3.
"insignificantly" " " " " " 2
"not at all" " " " " " 1

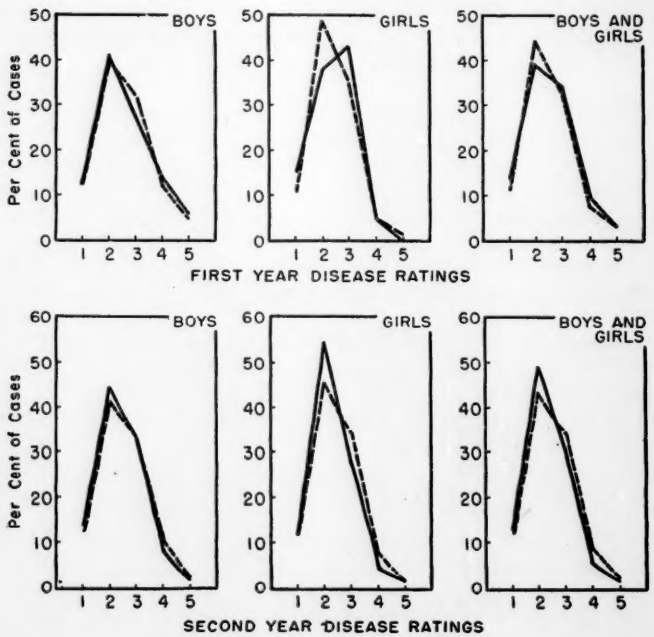

FIGURE 1

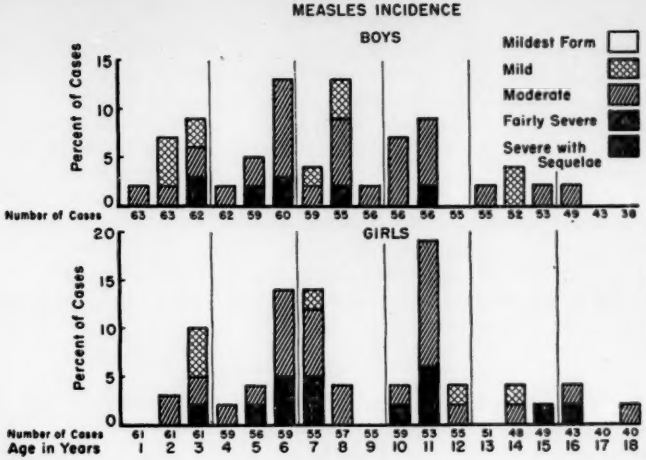

FIGURE 2

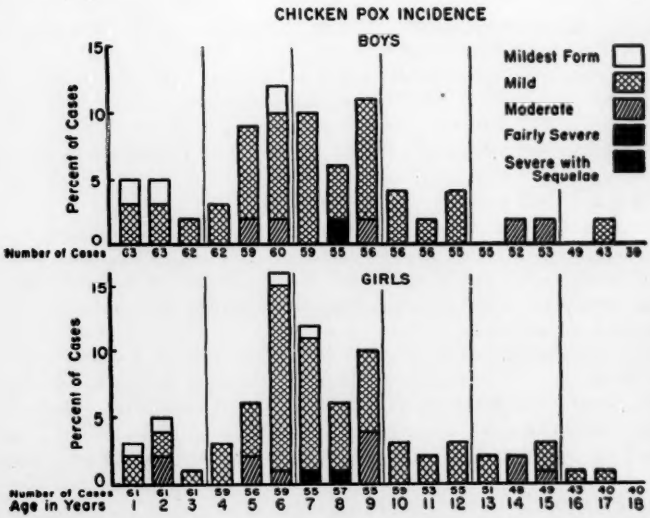

FIGURE 3

Comparative Data

Although few surveys have been reported of the incidence of illness in healthy children, Dr. Holland's comprehensive analysis of the disabling diseases of childhood (2) provides a valuable background against which to consider our own findings. Her report is based on the records of 500,000 children collected the country over in a National Health Survey in 1935-1936, years which fall in the very center of our span of data collection. In regard to acute communicable diseases, data from the Berkeley Health Department provide another basis of comparison and validation. Bayley's data (3) are comparable in several aspects. A recent report by Norval and Kennedy (5) on illnesses in the first year of life of 417 infants also contains some material relevant to our own, as does a report by Kingsley and Reynolds on illness patterns (6).

Acute Communicable Diseases

The acute communicable diseases are the most easily identified of all childhood disorders, partly because of their clinical characteristics, partly because they occur only once. These factors, together with their great epidemiological importance, contribute to their being the diseases best documented in public health statistics. Their age incidence in our study is shown in Figures 2-5. Measles and chickenpox, whooping cough and mumps, in descending order, are responsible for most of the morbidity, with rubella, scarlet fever, and diphtheria occurring rarely.

The general shape of our incidence curves and the relative frequency of the various diseases are similar to the national figures for 1935-1936 and to the Berkeley figures for the year 1936. This is shown in Figures 6 and 7, where the conventional public health calculations per 1,000 population have been converted to simple percentages and where our ages have been grouped to conform with public health practice. In Figure 7, where the several diagnoses are pooled, all three sets of figures present a peak in the age range five to nine years, with only about one half as much illness preceding and about one third as much following.

The similarity to the public health figures is surprising, considering the different ways in which the data were collected: *the national data* from one intensive survey of health in the year preceding contact, *the Berkeley data* from good city health department reporting, and *our own data* from frequent contact over an eighteen-year period, as described. With regard to the national figures, it should be noted that although Holland's totals are based on a cross section of urban and rural areas, her breakdown into age groups is derived from city populations of 100,000 or over. When our study started in 1928, Berkely had a population of 78,000 and did not reach 100,000 until 1944. This does not invalidate the comparisons, however, since the Holland data show no special changes once cities have attained a population over 25,000.

Certain discrepancies, however, probably reflect differences in data col-

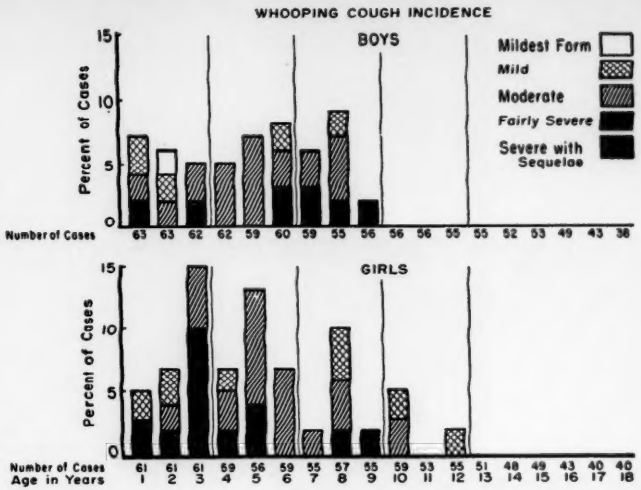

FIGURE 4

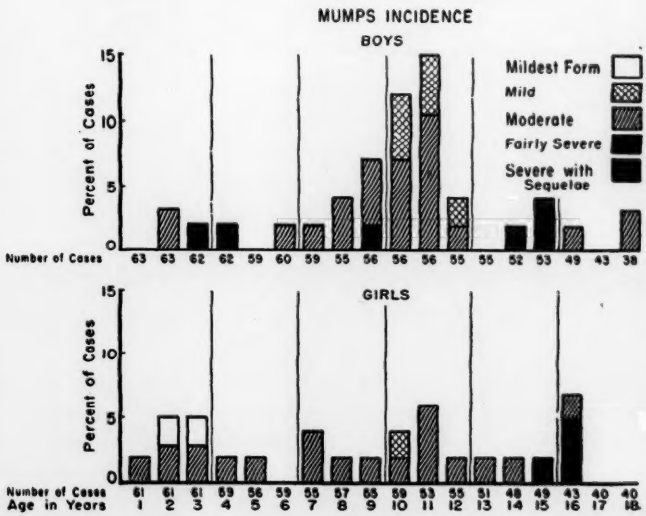

FIGURE 5

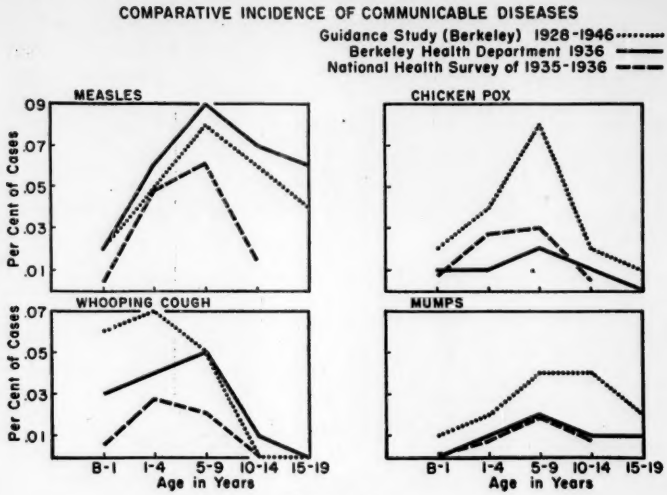

FIGURE 6

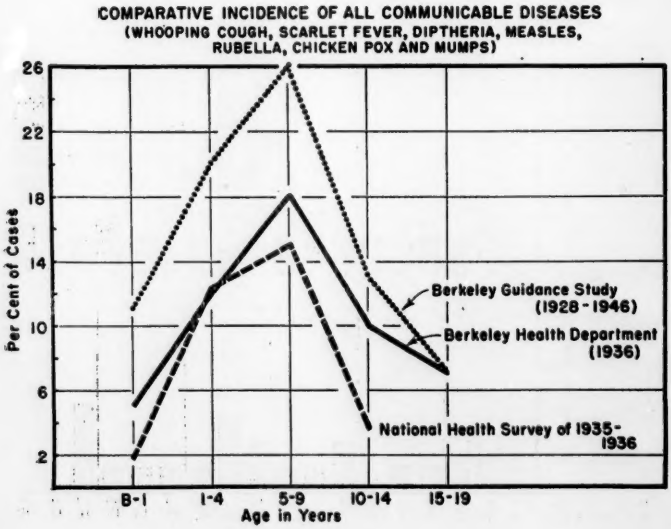

FIGURE 7

lection. For instance, the later peak age for whooping cough in Berkeley could reflect the large role played by the school nurse in this city's case findings, whereas our generally higher degree of reported morbidity could reflect the closeness of our contact.

Figure 8 illustrates the high total individual experience with the more common communicable diseases, even though their yearly age incidence is low. Thus, over 70 per cent of children have measles or chickenpox before they are 18, and over one third have mumps. The high incidence figures for whooping cough have, of course, been sharply reduced since the introduction of active immunization in the last decade.

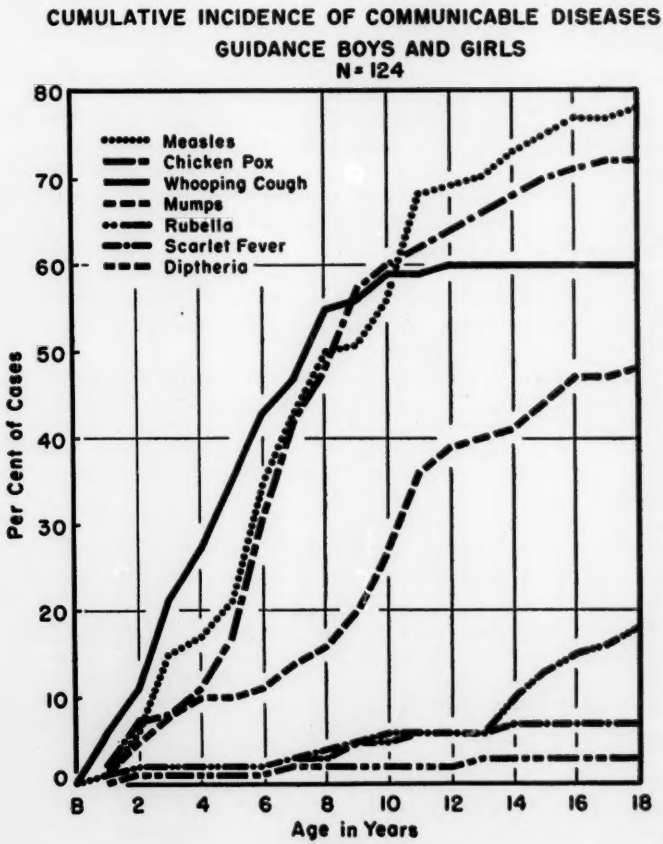

FIGURE 8

Another way of showing the widespread occurrence of communicable disease is by a longitudinal view of the separate records. Of 63 cases on whom health data are available every year throughout the study, all but one recorded at least one communicable disease.

Illnesses Other Than Acute Communicable Diseases

When we turn from the sure ground of the communicable diseases to less precise diagnoses, our figures are sharply higher than the national figures. Again this must reflect our close contact with a selected group of families, plus the fact that we have included illnesses which were of briefer duration than the "one week's disabling illlness" prescribed by the National Survey. Nevertheless, Dr. Holland's data, wherever they are available, provide helpful points of orientation for our own.

Colds

At every age through the seventeenth birthday, over 45 per cent of children reported at least one cold per year (Figure 9). The highest incidence was between the first and second birthdays, when 78 per cent of both boys and girls had at least one mild cold, and many had severe or continuous colds. From then on, there was an irregular decline with age. The early peak is of special interest in connection with the widespread anxiety about colds in nursery schools. Apparently, as soon as San Francisco Bay Area children step away from their cribs, they contact a population so largely infected with colds that there is a high probability of contagion, even without exposure to organized groups.

Our figures also permit some inferences with regard to cold immunity. From the continuing high incidence, it would seem that whatever immunity develops is either a gradual one, appearing as a response to repeated infections, or is due to somatic maturation regardless of infection. Analysis of the cold experience of the same children over the years gives some support to the concept of differences in natural immunity, since it is the same children who tend to have the most colds throughout. Comparisons were made between cold incidence in the first two years and in the first three years, respectively, considered against the incidence in selected later years (Table I).

Compared to Holland's figures, our children reported fifty times as much trouble with colds as did the national sample. Even if we compare only our figures for "severe" colds with the national figures, they are at least fivefold higher. However, our peak, like the national peak, falls in the age range 1–4. Bayley's series also exhibited a high incidence of colds in this period as well as some differences in apparent immunity. Norval and Kennedy, and Kingsley and Reynolds concur in the prevalence of colds and upper respiratory infections in infancy and early childhood, respectively. Our high incidence still falls short of the common observation that only rarely does anyone enjoy a full year without a cold.

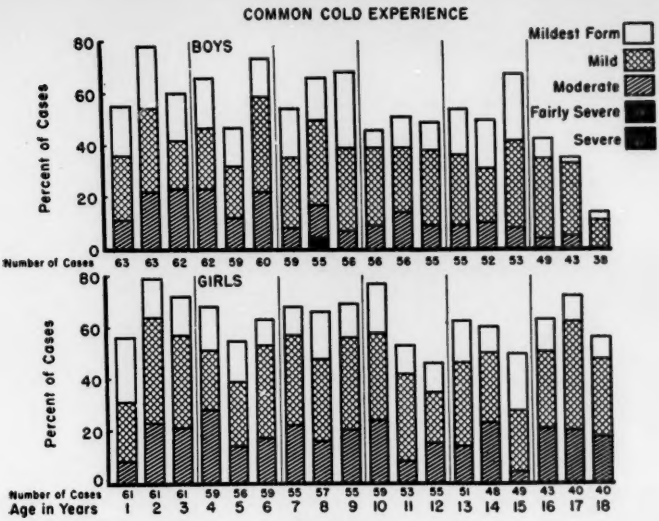

FIGURE 9

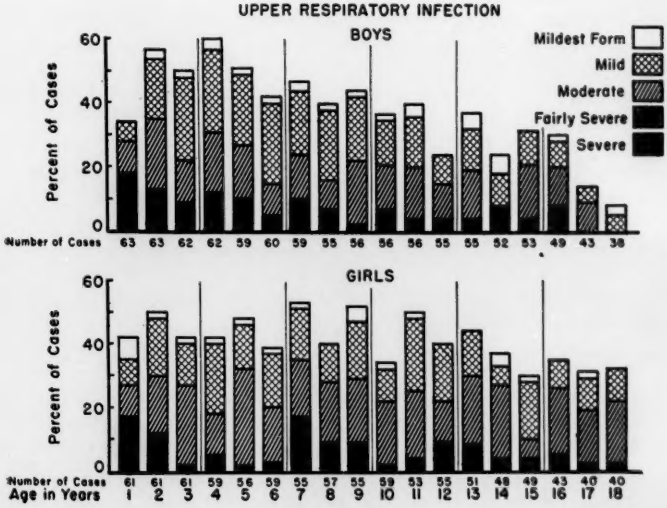

FIGURE 10

TABLE I

COMPARISONS BETWEEN COLD INCIDENCE IN FIRST TWO YEARS AND IN FIRST THREE YEARS, RESPECTIVELY, AND INCIDENCE IN SELECTED LATER YEARS

Boys and girls, combined		*N*	*r*
Cold incidence from birth to two years compared with incidence at:	4– 5 years	113	.10
	10–11 years	107	.21*
	14–15 years	102	.16
Cold incidence from birth to three years compared with incidence at:	4– 5 years	110	.13
	10–11 years	111	.24*
	14–15 years	104	.24*

* Significantly different from zero according to Student's *t* test as derived from Fisher's tables (7).

Upper Respiratory Infections

As with colds, the highest incidence of other upper respiratory infections was in the age range 1–4, with a gradual decline thereafter (Figure 10). Again the general pattern of incidence is similar to that reported by Holland, but our frequency is much higher, in the ratio of 45 to 1 for the peak years. When our figures for boys and girls are combined, the highest incidence for a single year is 53 per cent at age two.

There was no relation between the prevalence of colds and of other respiratory infections in the same children, i.e., children with many colds were not more likely than others to suffer tonsillitis or middle ear infections or pneumonia. This could have either a statistical or a medical meaning. It might be that there were so many colds and upper respiratory infections that their occurrence together by chance obscured any causal relation. Or it might be that, the etiology of the common cold being actually different from that of other upper respiratory infections, their occurrence together has no connection except through the bridge of general health and resistance.

No statistical test of early years vs. later morbidity with upper respiratory infections was made since inspection of the crude data gave no ground for expecting such a relationship.

Allergies

Four allergic symptoms were studied: eczema, hives, hay fever, and asthma. When all these diagnoses are considered together for each sex, there is a striking peak incidence of over 50 per cent at age 1–2, followed by a sharp decline and a slight adolescent rise (Figure 11).

Relations between early and late allergy experience are evident. Of 80 children exhibiting allergy before the fifth birthday, 50 per cent had an

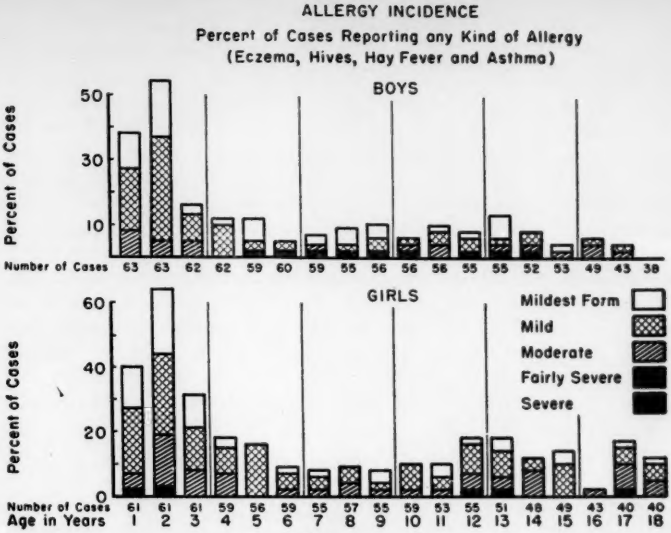
ALLERGY INCIDENCE
Percent of Cases Reporting any Kind of Allergy
(Eczema, Hives, Hay Fever and Asthma)
BOYS
Percent of Cases
50
30
10
Number of Cases 63 63 62 62 59 60 59 55 56 56 56 55 55 52 53 49 43 38
GIRLS
60
40
20
0
Mildest Form
Mild
Moderate
Fairly Severe
Severe
Number of Cases 61 61 61 59 56 59 55 57 55 59 53 55 51 48 49 43 40 40
Age in Years 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FIGURE 11

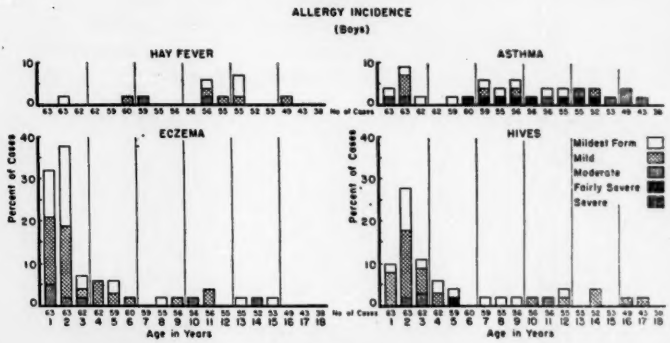

FIGURE 12

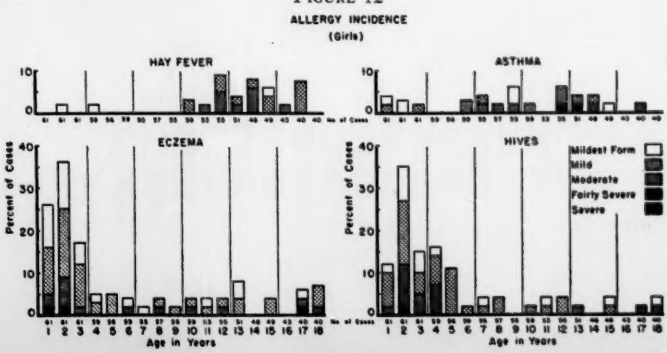

FIGURE 13

allergic episode later. Of 48 children having allergy after the fifth birthday, 83 per cent had such an episode early. In the present-day effort to understand allergy in both its somatic and psychosomatic implications, this finding gives weight to the idea that there is either a constitutional base for most allergic manifestations, or that important psychological factors enter the picture very early. To those symptoms which appear before the first birthday, it is reasonable to assign a primarily somatic diathesis.

When each allergic diagnosis is studied separately (Figures 12, 13), it appears that the early peaks are due almost entirely to the occurrence of eczema and hives. These then show a slight recrudescence in adolescence, but the predominant allergic diagnoses of the later years are hay fever and asthma. Our findings thus confirm the usual medical observation that allergy differs qualitatively as well as quantitatively with age. Another common medical observation, however, of a relation between allergic and gastro-intestinal disturbances in infancy could not be substantiated from

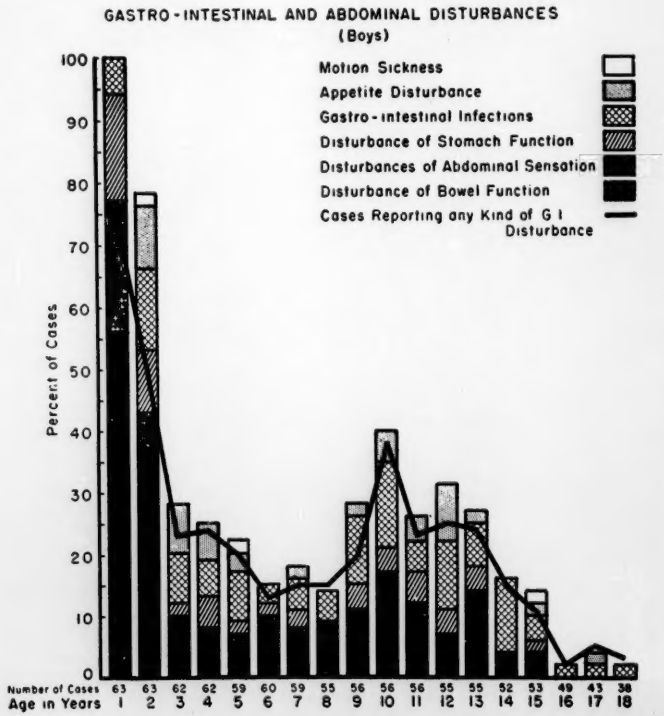

FIGURE 14

our data despite the similarity of the incidence curves for both kinds of upsets (see Figures 14 and 15).

Bayley's figures concur in the high early incidence of allergy, its continuity with gradual decrease, and its shifting symptomatology.

Gastro-intestinal and Abdominal Disturbances

Symptoms of disturbed gastro-intestinal function are reported more frequently in the first year than is any type of malaise, and occur more frequently then than in any subsequent year (Figures 14, 15). Thus, 75 per cent of boys and 70 per cent of girls exhibited some evidence of abdominal discomfort before the first birthday. The varied character of the disturbances can be seen from the charts, the extended description of the several diagnoses being listed in Appendix III. This statement is in apparent contrast to the findings of Norval and Kennedy (5) who report more respiratory than gastro-intestinal illness in this twelve-month period. The differ-

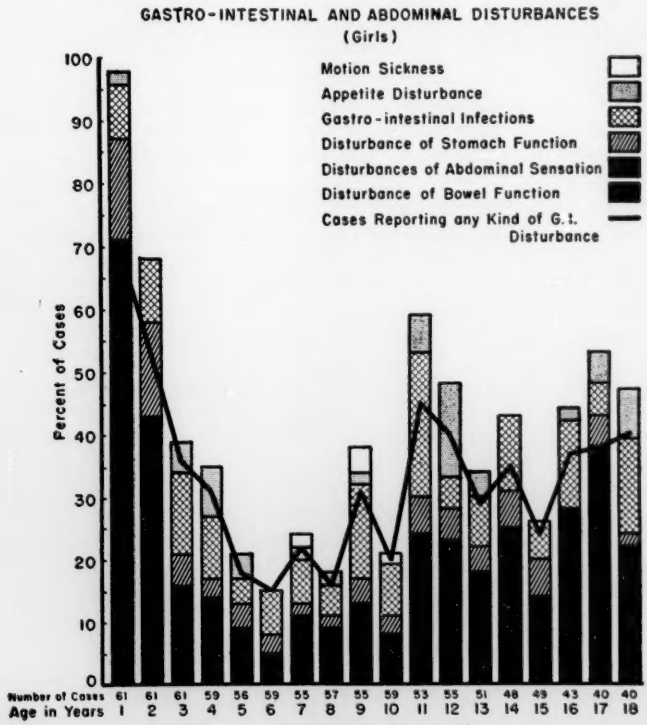

FIGURE 15

ence, however, is explained by the specific exclusion of noninfectious gastro-intestinal upsets from the Rochester figures.

After a sharp decline to the sixth year, the incidence of symptoms rises again, with differing degrees of steepness, in each sex. Among boys the occurrence of gastro-intestinal or abdominal discomfort reaches a pre-adolescent peak at age 10, and subsides again gradually until, after the fifteenth year, nothing occurs except an occasional infection.

Among the girls, however, the incidence of their discomforts in this area never definitely subsides after its secondary preadolescent rise. This incidence is due largely to vague disturbances of sensation, among which are included menstrual "cramps." Although the latter should theoretically be grouped with pelvic rather than with gastro-intestinal disorders, their occurrence in the lower abdominal cavity makes for a classic difficulty in differential diagnosis between pelvic and gastro-intestinal disease. The fact that there were nine appendectomies among our girls vs. two among the boys (see Figure 16) may be related to the greater susceptibility of girls to abdominal pain or may be a chance occurrence.

Surgery

The surgical experience of any group of patients is a record not so much of their diseases as of the modes of treatment of their diseases. These modes vary with many factors beyond the individual lesions. Many infections are now cured by chemotherapy and the antibiotics which previously required surgical intervention. Conversely, new surgical procedures have been developed for conditions of heart and lungs which would previously have received only passive medical attention. Indications for surgical intervention may also vary with certain periods and certain areas of the country; for instance, more tonsils are removed on the West Coast than in the Middle West, and in general, tonsillectomies are less frequent now than they were two decades ago.

Our survey of the surgical experience of the Guidance children must, therefore, be understood as a tabulation of specific treatments of diseases in which other forms of treatment or no treatment at all could sometimes have been elected. No conclusions should be drawn about the relative frequencies of the various diagnoses for which the surgery was performed. Except for circumcisions, the most frequent procedure in both sexes was tonsillectomy and/or adenoidectomy; setting and resetting of fractures came next. For boys, myringotomies and incisions for relief of infection were the next two significant categories, with the remaining procedures occurring infrequently. The order for girls differed only by the relatively more common occurrence of appendectomy, as was pointed out earlier (Figure 16).

The nose and throat operations were performed sufficiently often to permit an age incidence analysis (Figure 18). From Figure 19, it may be seen that tonsillectomies (total of 81) were more frequent in our group than in the

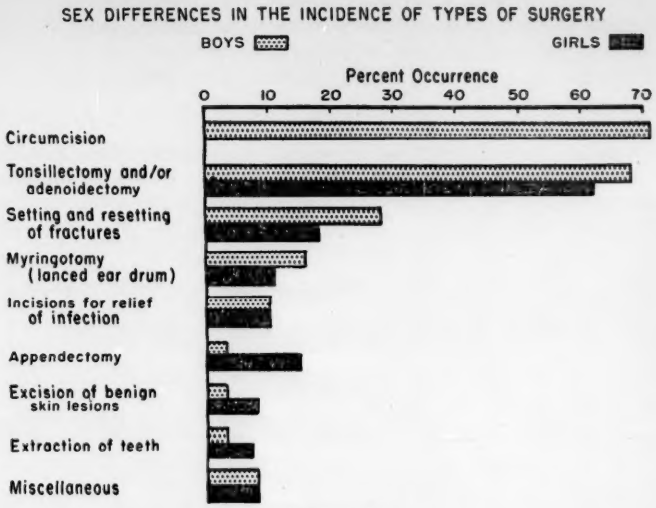

FIGURE 16

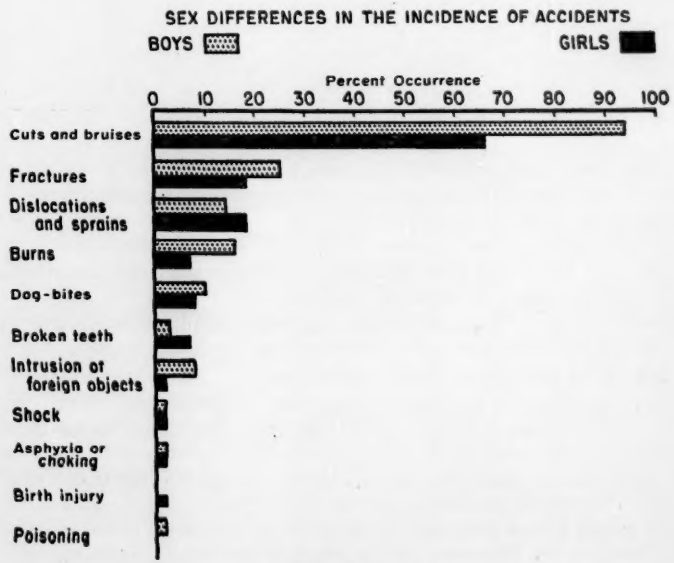

FIGURE 17

national report, but were performed largely in the same age range, between the first and tenth birthdays. Myringotomies were relatively rare (total of 17) and occurred with decreasing frequency after the first year.

Accidents

Cuts and bruises, fractures, dislocations and sprains, burns, and dog bites are the more common accidents in our group. The boys in this group had more accidents than the girls, as can be seen in Figure 17. Table II shows that 73 per cent of the girls had only one accident or none, whereas

TABLE II

PER CENT OF BOYS AND OF GIRLS, RESPECTIVELY, INCURRING SPECIFIED NUMBER OF ACCIDENTS

Number of Accidents	*Per Cent Boys*	*Per Cent Girls*	*Per Cent Boys and Girls*
0	24	34	29
1	27	39	33
2	27	15	21
3	8	2	5
4	9	5	7
5	2	2	2
6	0	2	1
7	3	0	2
8	0	0	0
9	0	0	0
10	0	2	1

only 51 per cent of the boys escaped with so little injury. Five or more accidents, however, were experienced by six girls and five boys, so that in this 5 per cent of relatively "accident-prone" children, there was no sex difference. The highest accident incidence was experienced by a girl whose ten injuries included three falls with bruises, two sprains, a severe burn, a fractured finger, cuts from an explosion, a finger smashed in a car door, and a dog bite. Of course, there is always the possibility that a seeming accident-proneness is merely a matter of more complete reporting. Up to age 14, the accident rate rose, then fell again.

Comparison with Holland (2) shows that our overall accident reporting is high and that our later decline is unexpected, perhaps due to less attention later to minor injuries. Our data are not complete enough to reveal whether in our group, as in hers, a decrease in home accidents was offset by an increase of accidents outside the home. Nor do they permit a breakdown into the categories used by Wolff (8) in his analysis of the mortality statistics of the Children's Bureau. He found suffocation to be the most common cause of death in infancy; drowning, burns, firearms, falls, and

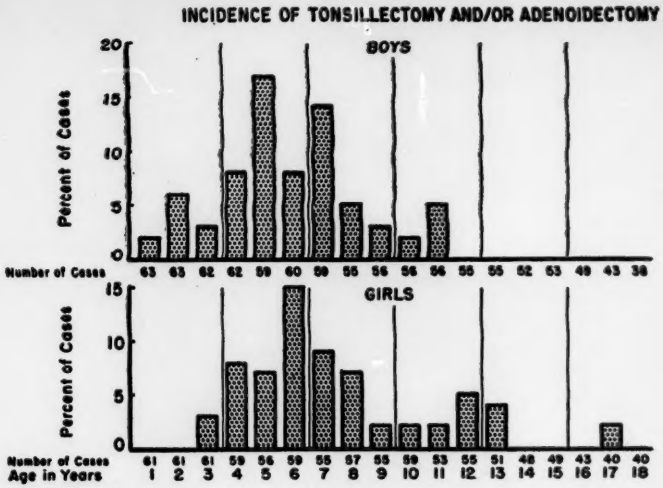
INCIDENCE OF TONSILLECTOMY AND/OR ADENOIDECTOMY
BOYS
Percent of Cases
20
15
10
5
0
Number of Cases
63 63 62 62 59 60 58 55 56 56 56 55 55 52 53 49 43 38
GIRLS
Percent of Cases
15
10
5
0
Number of Cases
61 61 61 59 56 59 55 57 55 59 53 55 51 48 49 43 40 40
Age in Years
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

FIGURE 18

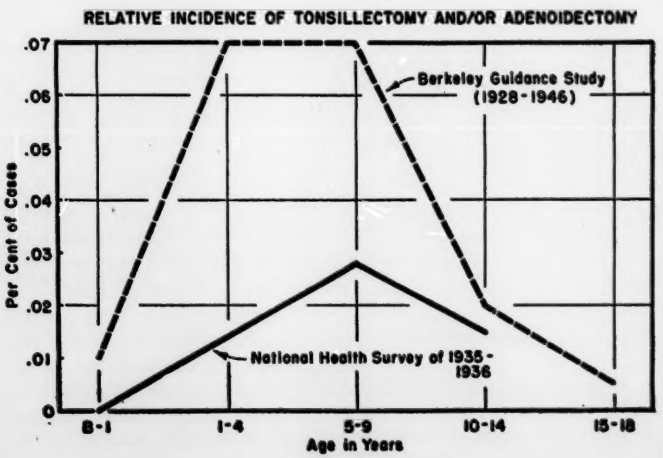

FIGURE 19

especially auto accidents to be the disasters of childhood; and occupational injuries to be responsible for adolescent deaths. In the eighteen-year period covered, no death occurred among the Guidance children.

Other Acute and Chronic Illnesses

After the more clear-cut disease entities were screened, there remained a miscellany of symptoms which were sorted according to sex, systems, age incidence, and duration, as elaborated in Appendix IV. Without regard to specific diagnoses, the data can be summarized according to systems and chronicity.

The skin, neurological and vasomotor, and endocrine were the systems most commonly involved. The age incidence of symptoms according to sex is illustrated in Figure 20. Both neurological and vasomotor, and endocrine symptoms increased during adolescence. Endocrine dyscrasias were diagnosed more frequently among girls than among boys, and this relative feminine preponderance increased with late adolescence.

The other symptom groups were noted in a descending order of frequency: eye, conjunctivae, and lids; systemic and nutritional; bone, joint and neuromuscular. Other systems were only occasionally involved.

Permanent disability occurred rarely. At the latest examinations one instance of each of the following diagnoses is on record: a slight congenital heart defect, well compensated; mitral stenosis with cardiac enlargement; chronic myeloid leukemia; tuberculosis of the lower spine with fusion operation; Erb's palsy; shortening of the right leg and scoliosis since age eight, etiology unknown. Three other children were suspected of heart disease in the course of their histories, but these diagnoses were later either not confirmed or specifically contradicted.

Summary

The illness experience of 126 normal children, as recorded in an eighteen-year guidance study, has been analyzed according to age, sex, and diagnoses. Wherever feasible, the data have been compared with national and local public health statistics.

Age Differences

When all the categories of illness are grouped according to five-year age periods, with the sexes pooled, the following conclusions can be drawn concerning their relative frequency and comparative patterns of incidence in our group (Figure 21).

Colds and upper respiratory infections accounted for the bulk of disability and were experienced by all children. The gastro-intestinal disturbances and allergy were important especially in infancy and in adolescence, the former system being the most frequent seat of ailments before the first birthday. The communicable diseases occurred at all ages, but had a sharp peak in the elementary school years. A small percentage of children had

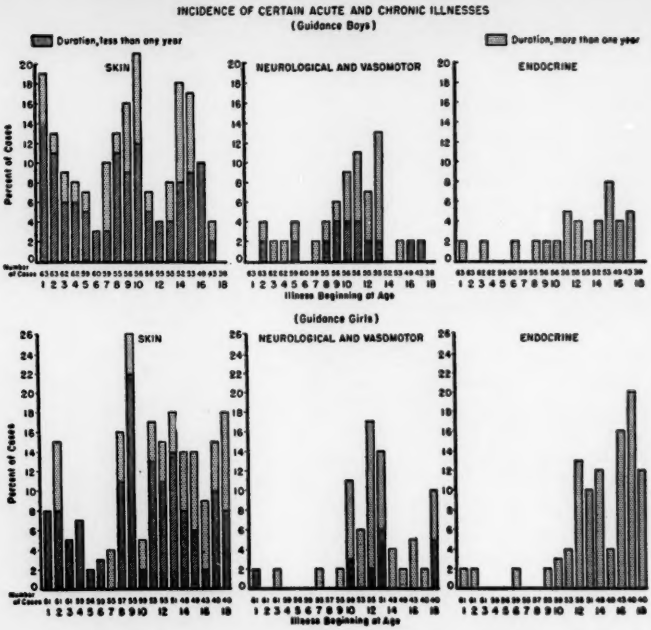

FIGURE 20

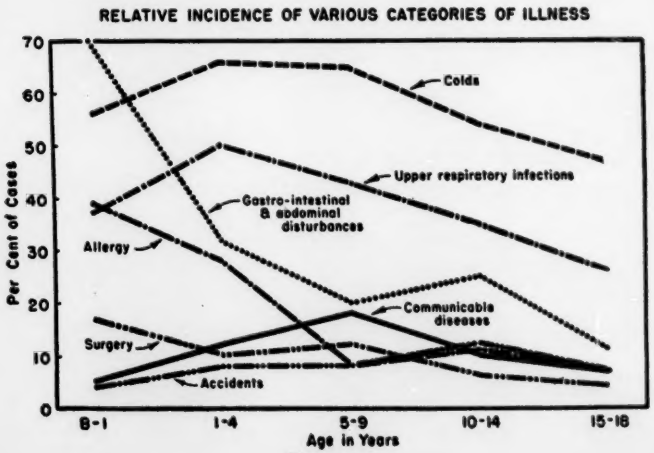

FIGURE 21

accidents and required surgery in every year; the surgical rate showed a gradual decline, the accident rate a gradual increase, at least up to mid-adolescence. A miscellany of residual diagnoses, sorted according to systems and according to chronicity, occurred throughout childhood. Symptoms involving the neurological, vasomotor, and endocrine systems increased during adolescence.

The incidence of colds over the years in the same children supports the concept of differences in natural immunity to these infections; some secondary immunity seems gradually to be acquired, a result either of maturation and/or of many repeated infections. The pattern of allergy experience shows characteristic age peaks, relations between early and late involvement in the same children, and symptoms which vary with age: eczema and hives appear earlier, hay fever and asthma later.

Sex Differences

Among both boys and girls, there was an adolescent rise in the incidence of gastro-intestinal symptoms, but the girls' rise was higher and was maintained through age 18, whereas the incidence among boys subsided gradually until, after the fifteenth year, nothing occurred except an occasional infection. There were nine appendectomies among our girls vs. two among the boys, a fact that may be related to the greater susceptibility of girls to abdominal pain. Accidents in general were more frequent among boys. Endocrine symptoms were more frequent in adolescent girls.

Conclusion

Every period of childhood has its special health hazards, none of them, according to the testimony of our group, too serious when ordinary care is given. Only a small percentage of children become afflicted with permanent ill health.

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Appendices

I. Illustrative Case
II. Classification of Illness
III. Classification of Gastro-intestinal Disturbances
IV. Classification of Certain Acute and Chronic Illnesses by Systems

Appendix I

Illustrative Case

Health History of Case No. 0421 (Boy)
Guidance Study, Univ. of Calif. Institute of Child Welfare

Condition of mother during pregnancy and at birth: good. Labor 10 hr., delivery spontaneous.

Weight at birth: 6 lb., 11 oz. Throughout the study he was sturdy, broadly built, and active; an athlete and leader.

2 mo.	Loose bowels but not diarrhea. Constipation first 2–4 mo.
5 mo.	Circumcised. Colic 2 hr. last month.
7 mo.	Both ears abscessed.
1 yr.	3 mild colds, frequent hives, soreness between legs.
1 yr., 1 mo.	Whooping cough, very slight.
1 yr., 6 mo.	Hives again, cross. Teething. Fell and hurt eyelid.
1 yr., 9 mo.	Still hives, slight coryza, urticaria. Deficient muscular tone. Diet may not be entirely suitable.
2 yr.	Hives come and go—better. Thinks bananas cause. No illness in 3 mo.
2 yr., 6 mo.	Swollen face, bad hives.
2 yr., 10 mo.	Cold after return from trip.
3 yr.	No hives. 2 mild colds (one recent). Drank coal oil, emergency treatment at hospital. Average development and nutrition.
3 yr., 1 mo.	Infected ear.
3 yr., 7 mo.	1 mild cold in 7 mo.
4 yr.	No colds. Subject to hives. Too many sweets. Urticaria. Poor tissue turgor. Slight nasal discharge.
4 yr., 6 mo.	1–2 mild colds.
5 yr.	Mild eczema, chronic nasal congestion, hypertrophied tonsils and adenoids. 1 cold. Needs dental care.
6 yr.	Hypertrophied tonsils and adenoids. Advise T and A. Tonsillitis three times. Fleas. Tonsillectomy.
7 yr.	Robust. Dental caries. 1 very mild head cold.

8 yr.	1 cold, 1–2 wk., average severity. Phlegm, throat irritation for several months; school dr. recommended rest. Stepped on nail this month, emergency hospital treatment; okay.
8 yr., 2 mo.	All siblings in bed. This case had mumps 2 wk., average. Pink eye for 1 wk. Few colds. Sore throat.
8 yr., 6 mo.	Chronic sinusitis and rhinitis.
9 yr.	Slight internal strabismus (right). Moderate injection and swelling of mucous membrane (right) in nose. Had infected "bottom part."
9 yr., 6 mo.	Scarlet fever in Mar., average severity, out 4 wk. Minor colds. Chronic throat irritation in warm weather. Slight infection both eyes. Caries 2 teeth.
9 yr., 7 mo.	Home with a fever.
10 yr.	Slight injection and swelling of membrane of both nostrils. Some colds, sore throats.
10 yr., 6 mo.	Colds off and on all winter.
11 yr.	Out of school. Bronchial irritation and several colds. Weight gain.
11 yr., 6 mo.	Negative.
12 yr.	Throat irritation occasionally flares up and disturbs sleep. Colds 2–3 days, mild.
12 yr., 6 mo.	Measles, flu, few colds.
13 yr.	Occasional cold, slight one now (mostly summer). Chronic appendix pain, 1 attack. Occasional attack hay fever.
13 yr., 6 mo.	Negative.
14 yr.	Seborrhea, face.
14 yr., 2 mo.	In bed with ugly rash. Chickenpox, out of school 3 wk.
14 yr., 6 mo.	Negative.
15 yr., 1 mo.	Tooth extraction. Cold 2 days, average. Exostosis, lower end right tibia, following injury.
15 yr., 6 mo.	Tooth extraction, 2nd.
16 yr., 1 mo.	No illness. Slight ecchymosis, region left patella. Not tender.
16 yr., 6 mo.	Colds twice for 3 days, mild.
17 yr.	No illness. Snellen: 15/15, 15/15.
17 yr., 6 mo.	Negative.
18 yr.	Passed paratroopers' physical exam. Height: 70 inches. Weight: 170 lb.

The ages quoted are the ages at times of reporting; the illnesses occurred in the interval just preceding.

Appendix II

Classification of Illness

I. Acute Communicable Diseases
   A. Measles

B. Chickenpox
C. Whooping Cough
D. Mumps
E. Rubella
F. Scarlet Fever
G. Diphtheria

II. Colds

III. Upper Respiratory Infections Other Than Colds

IV. Gastro-intestinal and Abdominal Disturbances (expanded in Appendix III)
A. Motion Sickness
B. Appetite Disturbance
C. Gastro-intestinal Infections
D. Disturbances of Stomach Function
E. Disturbed Abdominal Sensation
F. Disturbance of Bowel Function

V. Allergy
A. Eczema
B. Hives
C. Hay Fever
D. Asthma

VI. Accidents
A. Cuts and Bruises
B. Fractures
C. Dislocations and Sprains
D. Burns
E. Dog Bites
F. Broken Teeth
G. Intrusion of Foreign Objects
H. Shock
I. Asphyxia and Choking
J. Birth Injury
K. Poisoning

VII. Surgery
A. Circumcision
B. Tonsillectomy and/or Adenoidectomy
C. Setting and Resetting of Fractures
D. Myringotomy (lanced ear drum)
E. Incision for Relief of Infection
F. Appendectomy
G. Excision of Benign Skin Lesions
H. Extraction of Teeth

VIII. Other acute and chronic illnesses, sorted by systems and divided according to duration of more or less than one year, as listed in Appendix III.

Appendix III

Classification of Gastro-intestinal Disturbances

A. Appetite Disturbances
   - Anorexia
   - Food finickiness
   - Nausea

B. Motion Sickness

C. Disturbed Abdominal Sensations
   - Upper abdominal pain
   - Lower abdominal pain
   - Gas, colic
   - Menstrual pain

D. Disturbances of Functions of Stomach and Small Intestine
   - Vomiting
   - Regurgitation
   - Spitting up
   - Pyloric stenosis
   - Indigestion

E. Disturbances of Function of Large Intestine
   - Constipation
   - Diarrhea
   - Dysentery
   - Laxatives
   - Suppositories
   - Enemas
   - Colonics
   - Hemorrhoids

F. Infections
   - Acute gastro-intestinal upsets, "flu"
   - Bilious attacks
   - Worms
   - Infestations

Appendix IV

Classification of Certain Acute and Chronic Illnesses by Symptoms

This is a tabulation of diagnoses and/or symptoms actually noted on our records.

1. Skin
   - < *1-year duration:* ringworm, athlete's foot, impetigo, blisters, poison oak, sunburn, pimples, boils, herpes, skin infections, fleabites, scabies, lice, dandruff, rash, folliculitis
   - > *1-year duration:* warts, keloids, psoriasis, acne, hemangioma, telangiectasis, birthmarks, moles, dermatographia
2. Neurological and vasomotor
   - < *1-year duration:* convulsions, fainting, delirium, sunstroke, hysteria, spasms, neuritis
   - > *1-year duration:* headaches, tics, vasomotor lability, tremors, jerking extremities, insomnia, hyperhidrosis, Erb's palsy
3. Endocrine
   - > *1-year duration:* thyroid, pituitary, disturbances of menstrual rhythm and flow, gynecomastia, hypertrichosis
4. Eye and conjunctival and lids
   - < *1-year duration:* infections, swollen eye, pink eye, blepharitis, conjunctivitis, bloodshot eyes, sty
   - > *1-year duration:* strabismus, squint, astigmatism, myopia, color-blindness, chronic infections, chronic blepharitis, granulated eyelids
5. Systemic and nutritional
   - < *1-year duration:* malaria, rheumatic fever, acidosis, glandular fever
   - > *1-year duration:* rickets, nutritional deficiency, anemia, obesity, sickly-looking, leukemia
6. Bone and joint and muscular
   - < *1-year duration:* muscular pains, arthritis, bursitis
   - > *1-year duration:* rounded back, deformity, club foot, flaring ribs, thorax asymmetry, torticollis, septal deformities, postural defects (scoliosis, flat feet, kyphosis), bunions, hammer toes, tilted pelvis, spondylolisthesis, sternal depression, tuberculosis of the bone, chronic arthritis, congenital dislocation of hip
7. Cardiac
   - < *1-year duration:* acute heart attack
   - > *1-year duration:* valve lesions, congenital lesions, hypertension
8. Urinary
   - < *1-year duration:* cystitis, bladder spasms
   - > *1-year duration:* nephritis, albumen in urine
9. Lymph glands
   - < *1-year duration:* enlarged glands, acute; adenitis; mononucleosis
   - > *1-year duration:* enlarged glands, chronic

10. Genital
    - < *1-year duration:* vaginal infection, leukorrhea, inflamed prostate
    - > *1-year duration:* phimosis, undescended testicles, migratory testicles, hydrocele, varicocele

11. Teeth and gums (other than structural)
    - < *1-year duration:* trench mouth, abscessed teeth, swollen gums, mouth blister, toothache

12. Miscellaneous
    - < *1-year duration:* chest pain, occasional pain in side, nosebleed, blood poisoning, abscesses, erysipelas, cyst on femur, paronychia, bursa, hair loss
    - > *1-year duration:* umbilical hernia, incomplete rectal closure, lung plug, tongue-tied, halitosis, deafness

Specifically disregarded were muscular and refractory lesions of the eyes, weight deviations, and structural, alignment, or carious lesions of the teeth.

AN ACOUSTICAL COMPARISON OF VOCAL PITCH IN SEVEN- AND EIGHT-YEAR-OLD CHILDREN

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The present paper brings together for inter-comparison the results of two previously reported acoustical studies of vocal pitch in the speech of children. In one of these investigations Fairbanks, Wiley, and Lassman (3) employed two groups of boys at ages seven and eight chronological years. In the other investigation Fairbanks, Herbert, and Hammond (2) were concerned with comparable female subjects. While both studies focused primarily on age comparisons, their design permitted combination of the data for four-group statistical analysis bearing on sex as well as age differences. The following summary of the basic investigations is presented as background.

I. PROCEDURES AND RESULTS OF BASIC INVESTIGATIONS

Each study employed two age groups of 15 subjects each, one at age seven and one at age eight, selection being otherwise at random. In Table I are presented means and ranges in age, height, and weight. It is understood that the material on height and weight is presented for record only, and that these variables were not controlled. Age was limited in range as shown so that the age groups were discrete for each sex. The minimum difference between the oldest seven-year-old subject and the youngest eight-year-old subject is seen to be seven months, while the maximum difference between the oldest and youngest subjects is 15 months.

TABLE I

GROUP MEANS AND RANGES FOR AGE, HEIGHT, AND WEIGHT. FOUR GROUPS OF 15 SUBJECTS EACH

		MALE		FEMALE	
		Age 7	Age 8	Age 7	Age 8
Age (mos.)	Mean	84	96	84	95
	Range	82-86	94-97	82- 86	93-97
Height (ins.)	Mean	49	51	50	53
	Range	44-57	47-57	45- 64	50-58
Weight (lbs.)	Mean	56	61	56	60
	Range	42-82	50-81	40-134	46-75

Experimental procedures were alike in all instances. Each subject was brought into the laboratory individually, and read aloud a specially con-

structed primary-level test passage of 52 words, which was set up as the central portion of a longer passage (3). A high-quality disc phonograph recording was made of each performance. Oscillograms of these samples were made and subjected to fundamental frequency measurement. Acoustical data thus secured were tabulated and further measurements were made following routines previously established (1). For each subject the data yielded a number of final measurements of various aspects of vocal pitch which were used in the group computations.

Group means for the 12 pitch measurements treated in this paper are given in Table II. Thorough discussions of these values have been made

TABLE II

GROUP MEANS FOR PITCH MEASUREMENTS. FOUR GROUPS OF 15 SUBJECTS EACH. UNITS: PITCH LEVEL, TONES ABOVE 16.35 CPS; OTHER PITCH VALUES, TONES

	MALE		FEMALE	
	Age 7	Age 8	Age 7	Age 8
Pitch Level	25.0	25.1	24.6	24.8
No. Downward Voice Breaks	1.7	1.7	1.6	1.7
No. Upward Voice Breaks	2.1	2.0	1.5	1.7
No. Total Voice Breaks	3.8	3.7	3.1	3.4
Total Pitch Range	9.8	9.7	10.3	10.0
90% Pitch Range*	3.6	3.9	3.7	3.3
Extent Downward Inflections	1.8	1.9	1.7	1.8
Extent Upward Inflections	1.5	1.5	1.4	1.5
Extent Total Inflections	1.7	1.7	1.5	1.7
Extent Downward Shifts	1.8	1.5	1.7	1.5
Extent Upward Shifts	2.2	2.3	2.2	1.9
Extent Total Shifts	2.0	2.0	2.0	1.7

* 95th percentile minus 5th percentile.

(2, 3) and will not be repeated in detail here. In pitch level the means are similar to those of adult females and of male children up to age 14, and are approximately one octave higher than those of mature males. It will be seen in Table II that voice breaks were found in all groups. These breaks were comparable in frequency of occurrence, extent, and location to those of mid-adolescent males, permitting the somewhat revolutionary conclusion that these phenomena may not be attributed exclusively either to adolescence or to the male child. In certain standard measures of pitch variability, commonly considered to be related primarily to oral reading and speaking ability, the group means, shown in the lower portion of the

table, were similar to those of older children, and, in many respects to those of adults.

The differences between the means are impressively small. All apart from statistical tests of the significance of differences, persons familiar with the usual experimental values obtained in studies of this type will immediately recognize the perceptual smallness of the maximum differences. Thus, for example, the means for pitch level, descriptive of the central tendencies of the distributions of pitches used, are confined within a musical extent of 0.5 tone, or one semitone. In the basic studies the differences between the age groups were not statistically significant.[1] In both instances the design was a two-group comparison between ages seven and eight, sex constant, the test of significance being the *t*. Comparisons between the sex groups were not made.

TABLE III

ANALYSIS OF VARIANCE IN PITCH MEASUREMENTS. FOUR GROUPS OF 15 SUBJECTS EACH: MALES AGE SEVEN, MALES AGE EIGHT, FEMALES AGE SEVEN, FEMALES AGE EIGHT.

UNITS: PITCH LEVEL, TONES ABOVE 16.35 CPS; OTHER PITCH VALUES, TONES

	VARIANCE†		
	Between Groups	Within Groups	*F*‡
Pitch Level	0.809	1.388	0.583
No. Downward Voice Breaks	0.044	5.414	0.008
No. Upward Voice Breaks	1.178	6.586	0.179
No. Total Voice Breaks	1.311	20.162	0.065
Total Pitch Range	1.254	8.873	0.141
90% Pitch Range*	0.788	1.117	0.706
Extent Downward Inflections	0.089	0.157	0.567
Extent Upward Inflections	0.091	0.140	0.650
Extent Total Inflections	0.086	0.119	0.723
Extent Downward Shifts	0.292	0.653	0.447
Extent Upward Shifts	0.552	0.395	1.398
Extent Total Shifts	0.387	0.324	1.194

* 95th percentile minus 5th percentile.

† *df*: Between, 3; Within, 56.

‡ *F*, 3 & 55: 1%, 4.16; 5%, 2.78.

[1] A seemingly unimportant exception occurred in the study of girls (2), in which the differences between the age groups in extent of upward and total pitch shifts were found to be significant at the 5 per cent level.

II. Results

Analysis of Variance. The present study tested the hypothesis that the four basic experimental groups, representing both sexes at two age levels, were random samples from the same population with respect to the pitch characteristics in question. Table III presents the results of simple analysis of variance, carrying the four groups in parallel. With F required to equal 4.16 or 2.78 at the 1 per cent or 5 per cent levels, respectively,[2] it will be seen in the third column of the table that all obtained values fall far short of significance.

As a further test, "factorial" analysis was performed, employing an age-by-sex arrangement, with the results shown in Table IV. Age, sex, and interaction variances are given, and the within groups variances repeated from Table III. The F ratios are superfluous, as may be seen by inspection, but were calculated for record.

In general, neither Table III nor Table IV presents any evidence for rejection of the null hypothesis. This finding probably is particularly important with respect to pitch level and number of voice breaks, because of the relationship of these variables to development of the larynx as a function of age, and because of the obvious differences between the sexes at later age levels. It provides, furthermore, a suitable base of departure for the larger research program which has been planned, and which will consist of similar studies at successive age levels throughout childhood. Of special interest in these studies will be the determinations of the age levels at which significant differences between the sexes first appear, and at which differences between age levels first appear, sex constant.

Such studies will also increase the confidence with which the data of the present study may be interpreted. It has been shown here that the variances between groups are both absolutely and relatively small, and that all groups resemble mid-adolescent males in many respects. So radically do such findings depart from tradition that they must be accepted with great caution. Differences between fact and tradition, however, are hardly rare phenomena, and it should be pointed out that, within the knowledge of the author, the present study constitutes the first extensive, objective investigation of this problem. Nevertheless, two observations are in order: first, it is possible, although seemingly unlikely, that the four groups were unrepresentative of the sex and age populations from which they were randomly drawn; second, it is possible, although seemingly unlikely, that these seven- and eight-year-old boys and girls were not preadolescents, as ordinarily conceived.

Comparison of Variances. Sex Groups. In continuation of the analysis it was considered that some scrutiny of differences in variance might be profitable. The intention was not to test the assumption of homogeneity as such, but rather to examine differences in dispersion for trends related

[2] *df*, 3 and 56; working values 3 and 55.

TABLE IV

ANALYSIS OF VARIANCE IN PITCH MEASUREMENTS: AGE, SEX, INTERACTION. FOUR GROUPS OF 15 SUBJECTS EACH: MALES AGE SEVEN, MALES AGE EIGHT, FEMALES AGE SEVEN, FEMALES AGE EIGHT. UNITS: PITCH LEVEL, TONES ABOVE 16.35 CPS; OTHER PITCH VALUES, TONES

		SOURCE OF VARIATION			
		Age†	Sex†	Interaction†	Within Groups†
Pitch Level	*v*	0.541	1.837	0.049	1.388
	F‡	0.390	1.324	0.035	
No. Downward Voice Breaks	*v*	0.066	0.000	0.067	5.414
	F	0.012		0.012	
No. Upward Voice Breaks	*v*	0.000	3.266	0.267	6.586
	F		0.496	0.041	
No. Total Voice Breaks	*v*	0.066	3.266	0.601	20.162
	F	0.003	0.162	0.030	
Total Pitch Range	*v*	0.600	3.082	0.081	8.873
	F	0.068	0.347	0.009	
90% Pitch Range*	*v*	0.048	0.748	1.569	1.117
	F	0.043	0.670	1.405	
Extent Downward Inflections	*v*	0.047	0.203	0.016	0.157
	F	0.299	1.293	0.102	
Extent Upward Inflections	*v*	0.028	0.104	0.141	0.140
	F	0.200	0.743	1.007	
Extent Total Inflections	*v*	0.080	0.095	0.082	0.119
	F	0.672	0.798	0.689	
Extent Downward Shifts	*v*	0.751	0.041	0.085	0.653
	F	1.150	0.063	0.130	
Extent Upward Shifts	*v*	0.159	0.747	0.751	0.395
	F	0.403	1.891	1.901	
Extent Total Shifts	*v*	0.486	0.522	0.152	0.324
	F	1.500	1.611	0.469	

* 95th percentile minus 5th percentile.

† *df*: Age, Sex, Interaction, 1; Within Groups, 56.

‡ *F* = Given Variance / Within Groups Variance; *F*, 1 & 55: 1%, 7.12; 5%, 4.02.

to sex or age. It is thought that this might be of interest for comparative purposes in future investigations of other age levels, especially during the pubescent period.

For this part of the study the two basic groups of males first were combined, as were the two groups of females, yielding, thus, two sex groups of 30 subjects each. Table V presents variances and *F* ratios for these two combined sex groups. If the variances are compared horizontally it will be

TABLE V

TESTS OF HOMOGENEITY OF VARIANCE IN PITCH MEASUREMENTS. MALE VS. FEMALE. COMBINED SEX GROUPS OF 30 SUBJECTS EACH

	VARIANCE†		
	Male	Female	F‡
Pitch Level	1.188	1.513	1.274
No. Downward Voice Breaks	5.885	4.575	1.286
No. Upward Voice Breaks	9.099	3.628	2.508
No. Total Voice Breaks	24.409	14.547	1.678
Total Pitch Range	13.635	3.523	3.870
90% Pitch Range*	1.360	0.853	1.594
Extent Downward Inflections	0.198	0.108	1.833
Extent Upward Inflections	0.121	0.154	1.273
Extent Total Inflections	0.134	0.101	1.327
Extent Downward Shifts	0.850	0.439	1.936
Extent Upward Shifts	0.593	0.201	2.950
Extent Total Shifts	0.463	0.184	2.516

* 95th percentile minus 5th percentile.

† *df*: 29.

‡ *F*, 30 & 29: 2%, 2.41; 10%, 1.85.

seen that they are greater in the male group in 10 of the 12 measures. In these 10 measures, F exceeds the tabled 2 per cent value in four instances and the 10 per cent value[3] in a fifth instance. It will be noted, however, that three of these five instances occur in extent of pitch shifts, the last three items of the table.

On the basis of these indications the five significant measures of Table V were further examined by reverting to the basic groups of 15 subjects each, and comparing males to females at the two age levels separately. This procedure yielded the 10 sets of values given in Table VI. Study of this table shows that the variance was larger in the male group in nine of the ten comparisons, that the difference in variance was significant beyond the 10 per cent level in six of these nine, and that five of these six significant differences were at age eight. Again it is observed that three of the six significant differences occurred in related measures of extent of pitch shifts. In none of the comparisons of Tables V and VI was the variance significantly larger in the female. It would appear justifiable, therefore, to record a slight tendency for variance to be larger in the male, especially at age eight.

[3] Tabled percentages are doubled in this application. Snedecor (4), p. 249.

TABLE VI

TESTS OF HOMOGENEITY OF VARIANCE IN PITCH MEASUREMENTS. MALE VS. FEMALE. BASIC GROUPS OF 15 SUBJECTS EACH. MEASURES SELECTED ON BASIS OF RESULTS OF TABLE IV

		VARIANCE†		
		Male	Female	F‡
No. Upward Voice Breaks	Age 7	6.409	4.409	1.454
	Age 8	12.429	3.095	4.016
Total Pitch Range	Age 7	11.487	1.470	7.814
	Age 8	16.749	5.789	2.893
Extent Downward Shifts	Age 7	0.376	0.499	1.327
	Age 8	1.337	0.399	3.351
Extent Upward Shifts .	Age 7	0.515	0.226	2.279
	Age 8	0.706	0.131	5.389
Extent Total Shifts ...	Age 7	0.312	0.213	1.465
	Age 8	0.643	0.126	5.103

† df: 14.

‡ F, 14 & 14: 2%, 3.70; 10%, 2.48.

TABLE VII

TESTS OF HOMOGENEITY OF VARIANCE IN PITCH MEASUREMENTS. AGE SEVEN VS. AGE EIGHT. COMBINED AGE GROUPS OF 30 SUBJECTS EACH

	VARIANCE†		
	Age 7	Age 8	F‡
Pitch Level	1.232	1.514	1.229
No. Downward Voice Breaks ..	7.137	3.321	2.149
No. Upward Voice Breaks	5.316	7.523	1.415
No. Total Voice Breaks	20.258	18.809	1.077
Total Pitch Range	6.327	10.917	1.726
90% Pitch Range*	0.633	1.603	2.532
Extent Downward Inflections ..	0.126	0.185	1.468
Extent Upward Inflections	0.108	0.170	1.574
Extent Total Inflections	0.083	0.153	1.843
Extent Downward Shifts	0.427	0.838	1.963
Extent Upward Shifts	0.358	0.456	1.274
Extent Total Shifts	0.255	0.393	1.541

* 95th percentile minus 5th percentile.

† df: 29.

‡ F, 30 & 29: 2%, 2.41; 10%, 1.85.

Comparison of Variances. Age Groups. As in the preceding section, the four basic groups were then combined into two age groups of 30 subjects each, and the same procedures followed. The results are shown in Table VII. In 10 out of the 12 measures the variance is larger for the eight-year-old children, and in two of these ten the difference is significant at the 10 per cent level. In number of downward voice breaks and in number of total voice breaks the variance is larger at age seven, and the difference is significant at the 10 per cent level in the former measure. The three measures in which significant differences were found were singled out as above for similar comparisons employing the basic groups, with the results shown in Table VIII. The variance in number of downward voice breaks, represented by the first two sets of values, is seen to be larger at age seven in both males and females, the difference between the two female groups being significant at the 10 per cent level. In the remaining four comparisons the difference is in the opposite direction in three instances, and reaches significance at the 10 per cent level once. Except for the inexplicable reversal in the case of downward voice breaks, the data of Tables VII and VIII seem to indicate, then, a mild and inconclusive trend toward larger variance at age eight.

TABLE VIII

TESTS OF HOMOGENEITY OF VARIANCE IN PITCH MEASUREMENTS. AGE SEVEN VS. AGE EIGHT. BASIC GROUPS OF 15 SUBJECTS EACH. MEASURES SELECTED ON BASIS OF RESULTS OF TABLE VII

		VARIANCE†		
		Age 7	Age 8	F‡
No. Downward Voice Breaks	M	7.524	4.666	1.613
	F	7.257	2.209	3.285
90% Pitch Range*	M	0.823	1.956	2.377
	F	0.484	1.205	1.623
Extent Downward Shifts ..	M	0.376	1.337	3.556
	F	0.499	0.399	1.251

* 95th percentile minus 5th percentile.

† *df*: 14.

‡ *F*, 14 & 14: 2%, 3.70; 10%, 2.48.

III. SUMMARY

The basic data of two previously reported studies of vocal pitch (2, 3) were brought together for comparative analysis, the essential purpose being to investigate relationships to age and sex. Four experimental groups of 15 subjects each were included: male, age seven; male, age eight; female, age seven; female, age eight. Twelve characteristics of vocal pitch were studied, with results as follows:

1. The null hypothesis was found to be tenable for all of the 12 pitch characteristics. Among these were pitch level and number of voice breaks, a finding of special interest.

2. Tendencies for variance to be slightly but inconclusively larger in male children and in eight-year-old children were demonstrated.

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THE RELIABILITY AND VALIDITY OF THE MUMMERY ASCENDANCE SCORE FOR FIVE-YEAR-OLD CHILDREN[1]

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THE PROBLEM

This paper deals with the results of a study to determine the reliability and validity of the Mummery method as a measure of the ascendance of five-year-old children. It is an essential preliminary step to several investigations of the ascendant behavior of young children to be published in forthcoming articles. To date this method of measuring ascendance has been applicable only to three- and four-year-old children who know each other, that is, who play together regularly. To extend it to the five-year-old level would greatly increase its usefulness for both clinical and research purposes, since comparatively few children attend nursery schools, whereas many five-year-olds attend public kindergartens.

DEFINITION OF ASCENDANCE

For the study here reported, as well as for the preceding one by the writer (6), ascendance was redefined as follows: Ascendant behavior is any kind of behavior by which an individual attains or maintains mastery of a social situation or attempts to attain or maintain mastery so that he is in control of his own activities and can carry out his purposes. At the preschool ages, attempts at mastery of a situation include:

1. Attempts to secure materials he wants from his companions.
2. Attempts to direct or influence the behavior of companions.
3. Attempts to defend himself, his possessions, and his activities, and to resist direction of companions.

Mastery includes:

4. Success in the above three types of attempts.

SUBJECTS

The subjects were a group of 80 children attending one of the public school kindergartens of Athens, Georgia. For the purpose of establishing observer reliability, children in this group were randomly paired. Test reliability and validity were established on the scores of 27 five-year-olds

[1] The writer gratefully acknowledges her indebtedness to Jefferson Cobb, Research Assistant, who did the statistical work. Acknowledgment is also made to Margaret McPhaul, Supervisor of the University of Georgia Nursery School, who helped in establishing observer reliability, and to the teachers of the Barrow Kindergarten who participated in the ratings.

randomly selected from those in attendance. This group of 27 ranged in age from 63 to 71 months with a mean of 67.2 months. Intelligence test scores were not available. The distribution of the subjects among the seven divisions of the Minnesota Classification of Occupational Status prepared by Goodenough (2) showed that 63.0 per cent fell in the first two classifications as compared to 7.2 per cent in the general population. The group thus represented a selection upward in socio-economic status.

Experimental Situation and Procedure for the Measurement of Ascendance

As in the earlier study, scores were obtained by observing the behavior of children in a controlled play situation. On a low table was placed a sandbox measuring 18 × 36 × 8 inches filled with sand to within two inches of the top, and containing three toys. The toys were selected for their attractiveness to three-, four-, and five-year-old children, and were changed from pairing to pairing. The purpose was to provide a social situation that would bring out ascendant behavior and a wide range of techniques. This meant high interest value; that is, wanting a toy badly enough to go after it. The toy combinations were as follows:

Toy Set I. Wooden train (engine and one freight car), metal sugar scoop, medium-sized flour sifter.
Toy Set II. Small wooden ferry boat, sugar scoop, enamel sauce pan.
Toy Set III. Small blue dump truck, muffin tins, sugar scoop.
Toy Set IV. Sand sifter, wooden sand shovel, small truck.
Toy Set V. Larger wooden dump truck, sauce pan, sugar scoop.

Each child was paired with five other children drawn at random from the group, a different toy set being used for each of the five pairings. No child participated in the ascendance experiment more than once in the same day. The exact procedure observed for these pairings was identical with that for the three- and four-year-olds reported earlier.

Definition and Computation of Scores

Ascendance scores were based on a child's ascendant behaviors in five five-minute pairings. Three types of scores were used, two of which were the weighted scores used with the three- and four-year-olds. In one of these scores, referred to as the score of acceptable ascendance, a child receives credit only for using methods deemed socially acceptable by the judges who rated the children's methods. In a second, called the combined ascendance score, all of his ascendant behavior is taken into consideration by subtracting his undesirable ascendant acts from the score in acceptable ascendance. This score was substituted, as in the previous study, for a score in unacceptable ascendance because test reliability was too low for the latter. The third score, called the *f*-score, is an unweighted score consisting of the total number of ascendant behaviors (attempts), both acceptable and unacceptable. This is similar to the Jack score used in all previous ascen-

dance studies (1), (3), (4), (6), (7) in that it is unweighted, but differs in that it includes some behaviors, especially certain types of defense not counted by Jack, and does not include success (6).

Each weighted score for a child is the sum of the products of the frequencies for each category times the weightings. When a verbal and physical attempt occurred simultaneously, they were considered to be one attempt, and were assigned a value equal to the average weighting of the two methods. Success was given the same weighting as the corresponding attempt; that is, a successful attempt had a value equal to two times its weighting.

Observer Reliability

Observer reliability was established by the method of per cent of agreement, category by category, between two independent observers recording simultaneously. Both attempts and successes were counted, and it was reported as a disagreement in cases where one observer recorded a behavior under a verbal category only, and the other observer recorded it as a combination of the same verbal category with a physical category. Thus the agreement obtained indicates the agreement in the weightings that would be assigned. Since the main data of the study are based on five pairings for each child, this per cent agreement, based on *single* pairings, represents a "minimum" reliability. It should also be noted that in cases where the two observers recorded different categories but of *identical* weightings, it was considered to be a disagreement.

After considerable preliminary practice a per cent agreement of .86 was established on the last 15 (and the last 26 as well) consecutive pairings. This agreement was considered satisfactory inasmuch as the writer had previously established reliabilities of .98, .92, and .91 by two different methods described elsewhere.[2]

Ascendance Scores of the Five-year-old Children

Tests were begun on March 9 and completed on April 12, 1948, the average interval between first and fifth pairings being 15 days. Table I gives the range, mean, and standard deviation of the scores of this group of 27 five-year-old children. Comparison of the mean scores for positive ascendance with those for combined ascendance shows that there is a difference of only 8.2 points, indicating that this group of children showed a relatively large number of positive behaviors in relation to negative behaviors.

Reliability of the Data

The reliability with which the device measures the ascendant behavior of five-year-old children was determined by correlating scores on pairings

[2] Mummery (6), p. 54.

TABLE I

SCORES IN *f*–, ACCEPTABLE, AND COMBINED ASCENDANCE
FIVE-YEAR-OLD ATHENS GROUP

Score	*N*	*Range*	*Mean*	*Standard Deviation*
Acceptable	27	21 to 354	162.0	98.7
Combined	27	15 to 335	153.8	95.8
f-score	27	11 to 119	53.9	29.7

1 and 3 against 2 and 4 in the series of 5 pairings. These coefficients were .75, .71, —.03, and .81 which, by application of the Spearman-Brown formula, became .88, .86, —.08, and .91 for the acceptable, combined, unacceptable, and *f*-scores respectively. They compare very favorably with those obtained on the scores of the 42 three- and four-year-old Iowa City children.[3] In fact, each coefficient is higher than the corresponding one for the Iowa City data, although the number of children is smaller. These higher coefficients suggest that five-year-olds are more consistent in their behavior from pairing to pairing than are three- and four-year-olds.

The agreement between observers and these correlations on odd-even pairings are high enough to indicate that this experimental technique offers a reliable measure of acceptable, combined, and *f*-ascendance of five-year-old children. However, 5 pairings, or 25 minutes of activity of the type that occurs in this situation, proved to be insufficient for a reliable independent measure of unacceptable ascendance. The reasons for this low correlation on negative scores would seem to be, as was the case with the Iowa City data: 1) the infrequent occurrence in this experimental situation of unacceptable behaviors, 2) the narrow range in negative scores, and 3) the relative infrequency of behaviors with a high negative weighting, that is, the least desirable behaviors, when compared with those with a low negative weighting. A detailed analysis of positive and negative frequencies made on the Iowa City data appears in the previous study.[4]

VALIDITY OF THE DATA

The validity of the device itself as a measure of ascendance, that is, does it measure what it portends to measure, and the validity of the weightings for acceptability and unacceptability were determined in the previous study by securing the opinions of experts.

The validity of the experimental scores themselves as measures of the ascendant behavior of this group of five-year-old children, as viewed by the teachers in the play situation, was investigated by teacher ratings on

[3] *Ibid.* p. 56.
[4] *Ibid.* p. 51.

specially constructed five-point scales. Since the weighted score is affected by 1) the frequency of attempts, 2) the frequency of success, and 3) the *kind* of behavior, ratings were made in these three main areas. Teachers made three separate ratings on the frequency of each child's attempts; i.e., frequency of attempts 1) to secure possession of toys, 2) to direct behavior of companions, and 3) to defend himself and his possessions. Three similar ratings were made for success. Attempts were rated on a five-point scale by comparing each child with every other child. A five-point scale was also employed for success, but each child's success was rated in terms of the frequency of his own attempts; i.e., he was not compared with other children. To secure the ratings on method in the previous study, the categories of ascendant behavior were arranged under four large divisions on the basis of acceptability ratings. Teachers compared each child with his group on the frequency of use of each of these four large divisions of methods. Since only two coefficients were significant when it was applied to the Iowa City children, the scale was modified before obtaining ratings on the Athens group. The investigator felt that certain inconsistencies in the acceptability weightings assigned by the judges (6) greatly complicated the definitions of these four large divisions, making it difficult for the teacher to grasp each division as a unit. For instance, on the basis of scale-values only, the following types of threats fall in Division A: 1) all verbal threats to use physical force such as hitting, kicking, pushing, 2) all verbal threats of telling the teacher or of social consequences such as "I won't play with you" *when used in the attempt to get toys.* On the same basis, the following types of threats fall in Division B: 1) verbal threats of telling the teacher or of social consequences *when used to force or inhibit another child's activity or in defense of self or possessions;* and 2) all non-verbal threats of physical force, such as raising the arm as if to hit.

For this reason categories were allocated to the four large divisions on the basis of consistency rather than strict adherence to acceptability ratings. By this method *all* threats, verbal and non-verbal, were placed in Division A, and similar inconsistencies were eliminated. Since the investigator was attempting to establish the amount of agreement between the experimental data and the opinion of teachers, there can be no objection to this procedure, so long as categories in experimental data are similarly assigned to the four divisions. Teachers compared each child with the entire group on the frequency of use of each of these four large divisions of methods.

The correlation of ratings with experimental data on frequency of attempts yielded coefficients of .48, .54, and .55 (all significant at the 1 per cent level of confidence) for the first, second, and combined teachers respectively, as compared with a range of .36 to .79 for the Iowa City group.[5] Validity coefficients for frequency of success were —.36 to —.42 in the same order, as compared with a range of .02 to .36 obtained in Iowa City. These negative coefficients on frequency of success, two of which are

[5] *Ibid.* pp. 58 and 59.

significant at the 5 per cent level, are not easily explained. Although none of the corresponding coefficients on Iowa City data (N 19 and 23), and Athens three- and four-year-olds as well (unpublished), are significant, nevertheless they are all in a positive direction. Validity coefficients on frequency of methods ranged from —.30 to +.44, only two being in a negative direction. Four are significant at the 2 per cent and 5 per cent levels of confidence, and indicate that a positive relationship exists between the methods used by the children in the experimental and free play situations except in the case of Division A composed mostly of the least acceptable methods. It should be remembered that these latter methods occur very infrequently in the experimental situation. The remaining eight validity coefficients further show a trend toward a positive relationship, several approaching significance. It should be noted that neither of these teachers have had experience in making ratings called for in research, that 80 children are enrolled in the kindergarten, and that the situation could be described as teacher-controlled except when the children are out-of-doors. The opportunity to observe free play is therefore relatively limited.

Summary and Conclusions as Regards Reliability and Validity of the Measure for Five-year-olds

The purpose of this study, preliminary to several other investigations of the ascendant behavior of young children to be published in forthcoming articles, was to determine the reliability and validity of the Mummery method as a measure of the ascendance of five-year-old children. The subjects were a group of 80 five-year-olds in an Athens public school kindergarten. Scores were obtained in a controlled play situation, the measure consisting of five five-minute pairings each with a different companion and a different set of toys. The per cent of agreement on the last 15 consecutive pairings, category by category, between two independent observers was .86. Ascendance scores were obtained for 27 of these children. Odd-even reliabilities of .91, .88, and .86, respectively (Spearman-Brown), were obtained for a score of frequency of behavior, and for two types of weighted scores, one consisting of socially acceptable behaviors, the other taking into account both acceptable and unacceptable behaviors. The validity of the measure as determined by the ratings of teachers unaccustomed to rating scales was as follows: .48 to .55 for frequency of attempts, —.36 to —.42 for frequency of success, and —.30 to +.44 for general type of method used by the child. The above coefficients indicate that this experimental method gives a reliable measure of the ascendance of five-year-old children, and that it is a fairly valid indicator of the frequency of a child's attempts and of the methods he employs, but not of his success. The extension of this measure to include the five-year-old level greatly increases both its clinical and research usefulness in that it can now be used in public school situations.

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